United States Court of Appeals

for the Second Circuit

BRIEF FOR APPELLEE

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IN THE

United States Court of Appeals

For the Second Circuit.

U. S. PHILIPS CORPORATION,
Plaintiff-Appellee,

v.

NATIONAL MICRONETICS, INC.,
Defendant-Appellant.

BRIEF FOR APPELLEE.

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In The

UNITED STATES COURT OF APPEALS,

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U. S. PHILIPS CORPORATION,

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NATIONAL MICRONETICS, INC.,

Defendant-Appellant.

- -X

BRIEF FOR APPELLEE.

INTRODUCTION

Plaintiff regrets the length of this brief, made necessary by many contentions and statements in defendant's brief which are offered glibly but often without record support, requiring not only refutation but documentation to show this Court the absence of any foundation for those assertions.

This is the all-too common case of the conceded infringer[1/] who raises the cry of obviousness and assumes the mantle of defender of the public, in order to justify his appropriation of an invention, here representing the culmination of a decade of unsuccessful research and which was crucial to the growth of today's multibillion dollar computer industry by providing for the first time a practical and economic way of manufacturing magnetic recording heads in quantity with the required reproducibility of minute gap size within the closetolerances needed by the computer field.

COUNTER-STATEMENT OF ISSUES

Appellant's Statement of Issues (DB 2)[2/] is grossly distorted and biased. It is based on premises contradictory of the facts (e.g., such unfounded premises as that the patent claims no more than filling a space by a capillary process; and that distinctions over the prior art are not recited in the claims).

It should read:

> Is a process patent valid, which solves the problems of attaining reproducibility within close tolerances of minute glass-filled gaps between polished ferrite surfaces for magnetic recording heads, and of avoiding creating performance-impairing bubbles in the glass, by incorporating steps never before practiced separately or together in the pertinent art, namely, pre-setting the gap to its desired dimension

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1/ Defendant has not appealed from the holding that its process infringes the patent on appeal.

2/ "DB" refers to Defendant's Brief, at the indicated page.

by holding a spacing member of that dimension between the ferrite surfaces and only thereafter causing fluid glass to fill the gap from outside it, by the use of the known principle of capillary action, where there was no suggestion in the prior art that these problems could be solved by this method or by the use of this principle, and where the prior art for nearly a decade had unsuccessfully proceeded in a different direction.

STATEMENT OF THE CASE

The Trial Judge carefully followed the guidelines set down by this Court in Timely Products Corp. v. Arron, 523 F.2d 288, 294 (2 Cir. 1975), to see what persons of ordinary skill in the art at the time of the invention actually did or failed to do, in the light of availability of the necessary materials [Opin. p. 36 (67a)]. He properly considered the failures of others, long felt but unsolved need, and acceptance by industry, which the Supreme Court has called indicia of obviousness or non-obviousness1/ and which were indicated by Judge Learned Hand to be signposts of patentability which are more reliable than a priori evaluations based on inevitable hindsight.2/

However, defendant-appellant has given an overly simplistic and inadequate account of this activity and of the background of the art and the circumstances leading up to the invention. The following is believed necessary for a clear understanding of the patented invention, its position in the art, and the prior art.

General Nature of the Subject Matter

Preliminarily, this invention is not concerned with mundane subject matter like folding strollers, or heated socks, or undergarments, but rather with a sophisticated "high-technology" field, namely glass-bonded ferrite cores for magnetic recording

1/ Graham v. John Deere Co., 383 U.S. 1 at 17, 18 (1966).
2/ Reiner v. I. Leon Co., 285 F.2d 501, 504 (2 Cir. 1960), cert. den. 366 U.S. 929 (1961)

heads, which made possible the growth of the computer industry.[1/]

While magnetic heads are used in a general way for any magnetic recording (which, for example may be for such purposes as recording voice or music, or recording signals representative of scientific data) a major field of use is in electronic computers, where the data being handled by the computer is stored by recording on magnetic tapes or discs forming "disc files". For effective recording and reproducing of the greatest amount of information, it is necessary to enable the head to create magnetized spots on the recording medium which are very small and closely adjacent to one another in the direction of movement of the medium, and to sense such spots individually, without interaction with adjacent spots. Technology has accordingly exerted tremendous effort over several decades to increase the "information density" by reducing the size of the magnetized areas for each "bit" of information being recorded or sensed and by increasing the number of "bits" per unit length of the medium [Tr. 46-47 (104a-105a)].

These requirements have led to the use in the recording heads of a particularly advantageous non-metallic material called "ferrite", and to the use of as small a gap length as is feasible. In this technology, gap lengths as small as fifty to one hundred microinches (millionths of an inch) are used[2/] [Opin. 38 (69a), Tr. 47-49 (105a-107a), 177 (117a)].

1 Plaintiff's industry expert, Mr. Otto Kornei, said: "It can be said without any exaggeration that without the Peloschek patent, the enormous numbers of magnetic recording heads required in modern computers could never be produced in an economical way" [Tr. 969 (272a)].. "...the Peloschek patent was a real milestone in the development of magnetic heads... the Peloschek patent for the first time has made it possible to obtain close tolerances and inexpensive mass fabrication of glass-gapped ferrite heads" [Tr. 1196 (328a)].
2/ To understand better the minute dimensions involved here, a sheet of paper or a human hair is about 3000 microinches thick. These head gap lengths are therefore about 1/30 of the thickness of this paper, or even less. The difficulties in dealing with

Also, since hundreds of these heads may be used in a single computer disc file, it is vital, to enable operation in the desired manner within existing system parameters, that all of the recording heads be the same and conform extremely accurately to specifications prescribing gap dimensions, to an almost unheard of precision (specified to a few <u>millionths</u> of an inch). For instance, a popular magnetic disc file (IBM type 3330) provides a bit density of over 4000 bits (i.e., magnetized spots) per inch [Tr. 341 (197a)]. To read information recorded on a magnetic disc under these conditions requires heads each having a ferrite core of approximately 4 mils (.004 inch) thickness, with a gap having an effective length of between 90 and 110 microinches; that is, deviating from the center value of 100 microinches by not more than 10 millionths (.000010) of an inch [Tr. 680 (229a)]. Recording heads with gap lengths outside the prescribed specification will not perform as the system requires [Tr. 288-291 (170a-173a)] imposing the stringent requirement in this case of no greater deviation than 10 millionths of an inch. In some situations, 10 to 20% deviation is tolerated.

The record shows the vain efforts of substantial companies for nearly a decade to provide a commercially viable process for manufacturing glass bonded cores with uniformly high quality and within required tolerances, as the Trial Court found [Opin. 36-37 (67a-68a)].

<u>The History of the Art</u>

The early efforts to form the required minute gap consisted of placing a thin non-magnetic spacer foil or plate, such as of copper or glass, between the two ferrite polepieces, and clamping or cementing the assembly together.[1/] Instead of cementing a

such miniscule dimensions may be imagined even if not fully understood.

1/ Rosenberger U.S. Patent No. 2,919,312 (filed 1953), PX 151-D (390a-1), assigned to the leading German electrical firm of Siemens & Halske.

glass foil in place, it was also suggested to glaze the polepieces (i.e., to coat them with glass) before joining them.[1/] The General Electric Company followed a similar technique of bonding the ferrite pole-pieces by glazing, in 1955.[2/]

By 1955, Duinker of N.V. Philips Gloeilampenfabrieken, of Eindhoven, Holland, was concerned about being able to attain small gap sizes and to adjust the gap size to the desired value [DX-H, col. 1, ln. 67 (519a)]. He suggested placing a thin glass foil, somewhat thicker than the desired gap length, on one ferrite pole piece, placing the other pole piece on the glass (to form a "sandwich") and then applying heat to the assembly to soften the glass while applying pressure to squeeze the glass into intimate contact with the ferrite pieces, for a controlled time, to attempt to derive a desired gap length [see Opin. 26 (57a)]. To obtain the necessary extremely thin foils, a glass blower would stretch glass into a thin film by blowing a glass "balloon", which was later broken into fragments, from which would be selected the pieces having the required thinness [Tr. 208-09 (128a-29a), 223-24 (144a-45a)].

In 1958, Camras of the Armour Research Foundation of the Illinois Institute of Technology suggested improving the production of heads by using low melting point glass as adhesive for single-crystal ferrite polepieces.[3/]

In 1958, there were still difficulties in adjusting the gap length to the correct value. To overcome this, Duinker sought

1/ PX 151-B, p. 14-16 (378a-80a), by v. R. Cruel (1953).
2/ Chynoweth, "Ferrite Heads for Recording in the Megacycle Range", Teletech & Electronic Industries, Aug. 1955, PX 151-F (391a).
3/ U.S. Patent No. 3,079,470 [PX 146, Tab B (358a)] based on U.S. Patent No. 3,145,452 [PX 151-I (397a)] filed March 24, 1958. This was cited by the Patent Office against Peloschek.

to improve his sandwich process by inserting mica movement-limiting stops between the polepieces, to try to limit the extent of the squeezing process.1/

In 1960, N. V. Philips still put forward the same "sandwich technique" as the state-of-the-art process, in a definitive published report on its development of glass-bonded ferrite cores [PX 151-K (401-a)].

Even in 1961, Vilensky of Ampex Corporation2/ was still suggesting coating a glass suspension on the ferrite gap faces, drying it, placing the gap faces together, and then heating to soften the glass and bond the ferrite pieces, similar to the earlier GE work. His co-worker, Pfost shortly thereafter3/ taught coating the face of one of the ferrite pieces with glass, depositing movement-limiting stops in the form of silicon monoxide ribs on the face of the other piece, juxtaposing the two pieces, and applying heat and "very high pressure"4/ to try to force the ribs through the heat-softened glass until (theoretically) the ribs would abut the opposite ferrite face, to determine the limit for the squeezing process.

When these sandwich techniques failed to provide a satisfactory process (notwithstanding the numerous improvements and variations tried out) N. V. Philips undertook further strenuous (but initially unsuccessful) efforts to obtain a process for commercial production of glass-bonded ferrite heads. About 1960, a committee composed of about ten of its leading scientists from three of its

1/ DX-K (529-a). See col. 2, ln. 19 (530a). The use of metal limiting-stops in this way even preceded Duinker; the improvement he patented was to substitute mica for metal.
2/ U.S. Patent No. 3,188,400, filed Jan. 9, 1961 [PX 151-L (427a).
3/ U.S. Patent No. 3,283,396 [DX-L (533a)].
4/ Pressure of 3000 pounds per square inch is taught [Col. 2, ln. 49 (536a); col. 4, ln. 63 (537a)].

major laboratories (the Research Laboratories, the Glass Laboratories, and the Materials and Components Division) was organized to overcome the problems inherent in the "sandwich" technique [Tr. 225-27 (146a-148a)]. As shown by the committee minutes [DX-U (557a,583a)], a number of ways of making glass-bonded ferrite cores were suggested and tried, including (1) placing a glass rod between the ferrite surface, to be squeezed out instead of a foil [PX 248 (511a), Tr. 230-36 (151a-57a)], (2) placing an extruded glass foil in the form of a ribbon with a dumb-bell shaped cross-section between the gap surfaces in place of a flat glass foil [PX 249 (514a); DX-U6E, p. 2, ln. 19, p. 3, ln. 6 (558a-59a); Tr. 236-39 (157a-60a)], (3) depositing glass emulsions on the gap surfaces [DX-U2E, p. 1, ln. 7-17 (585 a); DX-U6E, p. 2, ln. 15-16 (558a); Tr. 239-40 (160a-61a), 263-65 (162a-65a)], (4) pre-glazing [Tr. 265-66 (165a-66a)], (5) using foils with organic binder as the gap filler [DX-U2E, p. 2, ln. 9-14 (586a); DX-U4E, p. 2, ln. 17-18 (591a); DX-U5E, p. 2, ln. 2-6 (594a); DX-U6E p. 1 ln. 18-19 (557a)], (6) using glass fleeces as the sandwich filler, and (7) using a thin organic adhesive layer with layer of glass powder applied thereon.

The process of squeezing a glass rod seemed the best hope, but this required high pressures for squeezing the rod a relatively large distance, with consequent reduced yields [Tr. 235-36 (156a-57a), 324 (192a); DX-U5E, p. 1, ln. 17-21 (593a); PX-248 (511a)].

IBM also was also actively engaged in seeking a solution to the problems inherent in the sandwich technique. As late as 1962, its Hanson patent[1/] still used the early Duinker process, and sought to improve it by providing grooves in the ferrite gap surfaces, to allow the interposed softened glass to distribute itself more readily for improved bonding.

1/ U.S. Patent No. 3,217,305, filed July 19, 1962 [PX 151-N (437a)].

All of these prior sandwich technique developments were characterized by two invariable features:

1. Before the bonding steps, the glass was first placed between the polepieces, either by glazing the polepiece faces or inserting a physically separate glass filler piece.

2. Thereafter, the assembly was heated to soften the glass, and <u>pressure</u> applied <u>to move the polepieces toward one another</u>, in order to squeeze out excess glass and for intimate bonding of glass to ferrite.

The art thus wore blinders: it considered only the sandwich technique, and strove vainly to overcome its disadvantages.

<u>Nature of the Problem Faced</u>

These prior techniques were found at best to be suitable for laboratory samples of glass-bonded ferrite heads, but wide commercial use of such heads was inhibited by the inability to produce the glass-bonded cores with consistent results, in volume, and with high yields [Tr. 202-04 (122a-24a), 966-67 (269a-70a)]. These processes (including the squeezed-rod process) even with the use of movement-limiting shims produced low and very variable yields of but 5 to 50%, meaning that half to 95% of the cores were rejected [Tr. 319 (189a)].

Two major problems remained unsolved. One was to be able to meet the customer-required gap-length tolerances, and the other was the "bubble problem" [Tr. 207 (127a), 213 (133a), 221-25 (142a-46a), 418 (212a), 1187 (318a)]. In addition, undesirable breakage occurred [Tr. 223 (144a), 326 (194a)]. All of this produced low and uncertain yields.

In volume production, it is inevitable that products will not be absolutely identical, but will vary from product to product

as a result of the manufacturing processes used. A "tolerance" is the permitted range of deviation from a normally specified characteristic (e.g. dimension) of a product within which it will function as desired [Tr. 289 (171a)]. System manufacturers desire "narrow" or "close" tolerances for the components of the system, to assure proper performance of randomly selected components in the system [Tr. 289-90 (171a-72a)]. On the other hand, the closer the tolerances, the greater will be the number of rejects (i.e. the "yield" will be lower) and the more difficult and expensive it is for the component maker to produce the desired volume quantity of like components all satisfying those requirements [Tr. 291 (173a)]. The customer (system manufacturer) therefore customarily specifies a tolerance range for the components which compromises but adequately accommodates both requirements, i.e., performance uniformity and cost [Tr. 290 (172a)].

The problem in obtaining a process for volume production of the head was aggravated by the extremely small dimensions involved: as mentioned above, for a nominal 100 microinch gap between the polished surfaces, for example, as used in the most common situations, the gap lengths for acceptable heads are permitted to have a latitude of only 10 to 15 millionths of an inch on either side of the nominal value, while for a smaller nominal 55 microinch gap, the latitude is but 10 millionths [Bubnack, PX 220-11, p. 126-27 (509a-10a); PX 203A]. This latitude is far less than 1/100 of the thickness of a sheet of ordinary paper or of a human hair.

In all the prior art, in assembling the parts of the core for glass-bonding the ferrite pieces, the glass material (whether in the form of foil or rod or glaze) had always been sandwiched between the

ferrite pieces before those parts were placed in confronting relationship [Tr. 1186-87 (317a-18a)]. The glass material and not the spacer shim (even where a shim was used) thus kept the ferrite pieces apart and prevented them from assuming a final position in relation to each other until the later heating step [Tr. 966-67 (269a-70a)]. Relatively high pressure was exerted on the ferrite pole pieces simultaneously with the heating to cause intimate contact between the glass and ferrite, as needed for making a firm bond, and also to squeeze out the excess softened glass [Tr. 207-36 (27a-57a)]. The pole pieces thereby moved closer together, by an amount depending on the pressure, the softness of the glass (determined by its temperature and composition) and the time the process is allowed to continue. [Tr. 212-13 (132a-33a); PX 141, col. 2, ln. 30-42 (351a)].

This process was not able to maintain close gap-length tolerances as was needed in commercial production in order to have uniformly reproducible results [Tr. 966-67 (269a-70a)]. There was difficulty in making the glass foils uniformly, to the required dimensions, due to the extremely small foil thicknesses required for gaps of about 100 microinches or even less in length [Tr. 213 (133a), 223-24 (144a-45a); DX U12E, p. 1, ln. 6]. Also, the handling and placement of the foils in proper positions for bonding was difficult, due to the extreme thinness of the pieces and their fragility [Tr. 224 (145a)]. Moreover, it was difficult consistently and reliably to control the multiplicity of interrelated factors of time, temperature, pressure and glass characteristics. This resulted in a wide range of final gap lengths, and an inability to maintain desired close tolerances, leading to a high percentage of rejects

and low yield. [Tr. 213 (133a)]. Even the use of movement-limiting stops or spacers described by Duinker in his '367 patent was not able to overcome this difficulty. The squeezing pressure on the glass would force the glass between the spacer and the moving ferrite face, or might even push out the spacer entirely, leading to a failure to attain the required close reproducibility of gap length [Tr. 224-25 (145a-46a)].

The Duinker process suffered also from the equally important bubble problem.1/ The bubble problem refers to the tendency present in all of the sandwich techniques for minute gas or air bubbles to be occluded within the gap material adjacent the ferrite surface, thus resulting in an area of the ferrite which is not in contact with and is thus unsupported by the glass [Tr. 213 (133a), 225 (146a)]. This was apparently caused by unavoidable surface irregularities and inevitable variations in flatness of the glass foil [Tr. 213-14 (133a-34a)]. With the very tiny gap lengths needed, even the most miniscule irregularities or variations in flatness were significant in causing bubbles within the glass or between the glass and ferrite. Such bubbles would lead to degradation of the core by chipping or crumbling of the granular ferrite material at such spots during grinding and polishing in manufacture or when the head was used in contact with the recording medium [Tr. 213-14 (133a-34a)]. This would impair the magnetic effectiveness of the core, by making the core behave as though its gap were longer than the actual physical length and thereby exceeding the permissible tolerances.

Another difficulty which arose was the consequence of the high pressure needed in manufacture. Because the glass, even when

1/ The Trial Court apparently felt it sufficient to refer to the gap reproducibility problem and did not discuss the bubble problem. However, the bubble problem was also of importance to the customer [Tr. 213-14 (133a-34a), 221 (142a)].

heated to the bonding temperature, was quite viscous,[1/] relatively high forces had to be applied to the ferrite pieces to force the glass into intimate contact with the ferrite and to squeeze the glass out to fill the entire gap [Tr. 224-25 (145a-46a)]. Such pressures operating on the relatively brittle ferrite material often resulted in cracking of the ferrite, and increased the reject rate [Tr. 221-25 (142a-46a)]. Higher temperatures which would permit more ready flow of the glass were not considered desirable because the glass tended to decompose and form gas pockets (creating more undesirable bubbles). Furthermore, at such higher temperatures the glass would tend chemically to interact with the ferrite to impair the ferrite properties at the gap, where they are most critical [Tr. 267 (167a), 271-72 (168a-29a)]. Moreover, if certain temperatures were exceeded, the ferrite itself would alter chemically and degrade. [Tr. 835-36 (248a-49a)].

In addition, when the cores were fabricated from bars bonded together,[2/] the relatively high pressures required also caused minute bending of the bars [Tr. 324-25 (192a-93a)]. Since there is a permissible leeway of only a few millionths of an inch, even extremely slight bending would cause some cores to differ in gap length from others, even if sliced from the same bar, enough in some cases to exceed limits of specified manufacturing tolerances. [Tr. 325 (193a); DX-U5E, p. 1, ln. 17-21 (593a)]. All of this led to a non-reproducibility of the gap lengths, resulting in a high percentage of rejects and low yields, making the sandwich method uneconomical for commercial purposes. [Tr. 213-14 (133a-34a), 221-24 (142a-45a)].

1/ At the usual working temperature of glass, it has a viscosity of about 1000 poise, some 100,000 times the viscosity or 1/100,000 the fluidity of water. Even in the melting range, this ratio is 10,000 to 1. [Tr. 784 (239a)].

2/ To permit making many bonded cores, by cutting and slicing the bars, as illustrated at DB 9.

Thus, as the Trial Court found [Opin. 36-37 (67a-68a)], for nearly a decade, the problems of close reproducibility of gap-length to tight tolerances plus elimination of bubbles and attainment of high yields, by a process suitable for commercial production, remained unsolved despite the efforts of these skilled scientists from prominent firms (Siemens-Halske, N. V. Philips, Ampex, IBM, I.I.T. Research Institute, Armour Research Foundation, General Electric Company).

It was at this stage in the art that Peloschek et al made their invention, which solved this problem which the art had failed to do for a decade.

THE PATENTED SUBJECT MATTER

The Peloschek patent[1/] specifically sets out the foregoing problems. It says it is directed toward manufacturing magnetic heads with very short gaps within close tolerances [col. 1, lines 21-24 and 29-33 (355a)], by economical and simple processing [col. 1, ln. 26-28 (355a); col. 2, lines 21-22 (355a)], and making the gap material homogeneous and bubble-free [col. 1, ln. 28-29 (355a); col. 2, ln. 20-22 (355a)]. These were the problems, not merely "the gap-filling process" as defendant urges [DB 10]. As the Trial Court found, "the patent addresses itself to the problems of manufacturing magnetic recording heads with very short gap lengths, simply, and achieving close gap length tolerances." [Opin. p. 23 (154a)].

The Peloschek invention was a complete departure from prior teachings [Tr. 965-71 (268a-74a)]. Instead of sandwiching the glass between the polished faces of the ferrite bars before the bonding

1/ PX 144 (354a). This patent has an effective filing date (and date of invention) of May 8, 1962, when the basic Dutch patent application was filed. For convenience of reference, it will be understood that references to "Peloschek" are intended to include both Peloschek and Vrolijks, his co-inventor.

operation, then heating and moving the ferrite pieces together to squeeze out the softened glass and to accomplish the bonding, as had been the approach in making glass-bonded recording heads up to then, Peloschek first maintained the ferrite bars in a fixed predetermined relationship at the appropriate desired spacing, independent of the glass, by the use of fixed pre-dimensioned spacers (called "shims") held between the ferrite pieces (thereby defining a pre-set empty gap); then the glass was placed adjacent to (but outside) the pre-set gap; and thereafter the glass was heated to a fluid state to cause it to be sucked into the pre-set empty gap during the bonding, without movement of the ferrite pieces, by making use of the old physical principle of capillary action. On cooling, the two ferrite bars become bonded together by the glass, to form a composite glass-bonded bar. [Tr. 294-303(175a-84a), 965-67 (268a-70a), 970-71 (273a-74a)]. The bonded bar is then sliced to form individual glass-bonded cores, each of which is a portion of a recording head [Tr. 304-06 (185a-87a)].

In addition, to prevent the glass from entering between the shims and the ferrite parts, the bars are pressed together against the shims with but a slight pressure during heating[1/] [Tr. 334 (195a); PX 144, col. 1, lines 47-50 (355a); col. 2, line 18 (355a); see claim 4 (356a)].

The Trial Court found [Opin. 23 (54a)] that the patent teaches presetting the gap plus flowing glass into the gap by capillary action, and [Opin. 34 (65a)] that the "crucial" feature of the process is the use of capillary action to fill a preset gap of

1/ Only enough force was applied to the ferrite parts to hold them in proper relative position against the spacers, which was only 1/5 to 1/10 the force previously required; this force was not applied to the glass at all, but only to the ferrite pieces [Tr. 324 (192a), 971 (274a)].

precise reproducible dimensions. The precise dimensions are of course supplied by having the spacing shims of a thickness equal to the desired gap length.

By this process Peloschek attained the desired highly accurate, closely reproducible, tiny gap lengths, which were unexpectedly found to be bubble-free [Tr. 318-20 (188a-90)].

The Patent Claims 1/

The nature and scope of the patented invention are of course defined by the patent claims. For the convenience of the Court, a portion of PX 179 setting out representative claims 1, 2 and 4 in outline form, is appended as Attachment A at the end of this brief.

These claims define a method of manufacturing portions of magnetic heads (i.e. cores) composed of two magnetic circuit parts (i.e. the two bars) consisting of ferrite material having a gap therebetween filled with glass which bonds the circuit parts together. The method of claim 1 comprises the steps of:

1. First placing at opposite ends of one polished ferrite gap surface spacing members (shims) having a thickness equal to the desired gap length.

2. Then placing the second polished ferrite gap surface on the spacing members to form an empty gap of a size equal to the desired final gap length.

3. Placing adjacent to the gap a quantity of glass with a melting point below that of the ferrite.

4. Heating the resulting assembly to the melting temperature of the glass to cause it to become fluid and fill the gap by capillary action, to bond the ferrite parts together

1/ It is understood that defendant is here challenging only those claims found both valid and infringed, i.e., Nos. 1-4, 6 and 8-11.

on cooling.

Claim 4 adds that pressure is applied to the assembly during the heating step. The patent makes clear [col. 1, ln. 47-50 (355a)] that this is but slight pressure, for maintaining the positions of the ferrite pieces and spacers against one another; this pressure serves no glass-squeezing function whatever since the pressure is applied to the ferrite pieces and spacer and not to the glass.

Claim 6 additionally specifies the slicing of the bars to form individual bonded cores. Plaintiff does not here urge that claim 6 is valid if claim 1 is not valid.

These claims therefore clearly specify the essential features of the invention:

1. Pre-setting the gap when empty by spacing the polished ferrite gap surfaces to the required final separation, by continuously held spacing members.1/

2. Thereafter inserting the glass, from outside the gap, by making it fluid and relying on capillary action.

It is these very features which overcame the deficiencies of the prior art and produced the solution to the problems which had vexed the art for a decade. The important advantages of obtaining small gap lengths reproducible within close tolerances and of elimination of bubbles are a necessary consequence of these steps,

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1/ Claim 10 omits specific recitation of the spacing members. This is immaterial, since "..it is fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention..." (U.S. v. Adams, 383 U.S. 39, 49 (1966)). Moreover, the other claims, such as claims 1 to 4, adequately recite the spacers and the slight pressure applied to retain the ferrite pieces in fixed relation during insertion of the glass. Each claim is an independent invention (Leeds & Catlin Co. v. Victor Talking Mach. Co., 213 U.S. 301, 319 (1909); 35 U.C. 282) and the validity of claims 1-4, by themselves, is sufficient to sustain the judgment below.

and particularly of first forming and retaining the proper gap size and thereafter filling the gap with fluid glass by capillary action (without disturbing the gap spacing).

The Unexpected Results Attained By The Patent Process

By going off in a new direction, diverging radically from and discarding the decade-old sandwich technique, which was the only prior method for fabricating glass-bonded ferrite cores, and by adopting a completely new concept of core fabrication [Tr. 965-67 (268a-70a), 1187 (318a)] Peloschek overcame the major disadvantages in prior processes for making glass-bonded ferrite heads, while retaining the advantages of the glass-bonded cores thus made [Tr. 318-19 (188a-89a), 324 (192a)]. Yields of 90% were attained, contrasted with previous reliable yields of but 5% [Tr. 319 (189a)], thus creating the first commercially viable process for making such heads.

To accomplish this, Peloschek had to violate established views of the glass art. It was the standard view of glass workers that the normal temperature for working glass should be within the range where the glass was soft, but still remained thick and not highly fluid [Tr. 779-81 (236a-38a)]. The customary working temperature range was (and still is) well below the temperature defined as the melting point, and the glass when in condition for working was many hundreds of times more viscous (i.e. thicker in consistency) than when molten [Tr. 781 (238a), 784 (239a)]. This was dictated by the accepted view that the temperature used for working glass should be the lowest practicable, and in addition that higher temperatures for the glass were undesirable because the glass might decompose and bubble at the higher temperatures, and might interact

chemically with the ferrite, making the core properties unpredictable after cooling [Tr. 267 (167a), 787 (240a), 836 (249a)]. Following these views, previously in making glass-bonded cores the glass had been softened only to the extent necessary for bonding to the ferrite, which permitted a thick viscous flowing of the glass (previously inserted between the ferrite pieces) if appropriate very high pressure were applied [Tr. 209-10 (129a-30a), 216 (136a), 231-32 (152a-53a), 297 (178a), 1209-10 (330a-31a)].

It is also significant that it was the view at the time of the Peloschek et al invention that glass material could normally not enter narrow gaps, and hence could not be capillary flowed [Tr. 405-6 (209a-10a), 1140-44 (301a-05a)] especially since the gaps here involved were much smaller than the usual capillary sizes [Tr. 475 (214a)].

However, the Peloschek invention provided a deliberate step of heating the glass to make it very fluid which is above the usual working temperature point, and used its flow properties to cause the fluid glass to be sucked into the empty pre-set gap between the polished pole pieces by capillary action. [Tr. 266-67 (166a-167a)].

Several important advantages stemmed from the use of the Peloschek process. Pre-setting the gap and holding it fixed during bonding enhanced the reproducibility of the desired gap sizes [Tr. 319 (189a), 970-71 (273a-74a)]. The absence of the need for very high pressure for squeezing the glass [Tr. 236 (157a), 324 (192a), 414 (211a), 971 (274a)] avoided breakage or chipping of the brittle ferrite bars, which lowered yields [Tr. 223 (144a), 326 (194a)]; avoided even minute deformation or bending of the bars, which had previously caused variation in gap size even among cores sliced

from the same bar [Tr. 325-26 (193a-94a)]; and avoided the necessity of careful regulation and maintenance of pressure in an effort to attain consistent yields.

One of the important benefits which derived from the Peloschek method was the discovery that the glass which filled the gap after the bonding was completed contained far fewer bubbles than in glass-bonded ferrite heads manufactured according to previous techniques [Tr. 318 (188a); DX-U10E, p. 2, ln. 9-12]. This benefit was unexpected since the geometry of the situation appeared to indicate that the bubble problem would be worsened. As Mr. Vrolijks testified, there was substantial fear that the process would provide even worse results, as to bubbles, because it was expected that an effort to flow molten glass into a miniscule gap for a depth of <u>over 1000 times</u> the gap size, and over a gap front of <u>more than 6000 times</u> the gap size, would create air pockets which would cause the bubble problem to worsen [Tr. 474-76 (213a-15a)].[1/]

There were no available teachings which would lead one to expect that it would be technically feasible to fill completely such a relatively long and narrow channel by capillary action, on a reliable and closely reproducible basis. It was not predictable in advance that higher yields of cores would be realized [Tr. 319 (189a), 325-26 (193a-94a)], or that even fewer bubbles would be created. Both the accomplishment of close reproducibility of gap size and the overcoming of this bubble problem thus constituted unexpected, and highly significant, advances in the art of magnetic head manufacture [Tr. 266-267 (166a-67a)].

1/ To appreciate this more readily, if scaled up to more usual dimensions, for a 1/4 inch gap size (i.e. gap length) this would require flowing the material into the gap for a depth of 20 feet, over a gap front of over 120 feet [Tr. 474 (213a)].

Another unexpected advantage which resulted was that proper strength of the glass-to-ferrite bond was attained, even though during the Peloschek process no pressure at all is applied between the ferrite and the glass to form the bond between glass and ferrite, as was required in the prior processes [Tr. 971 (274a), 977-78 (275a-76a)].

Another benefit derived from the practice of the Peloschek method is its adaptability to commercial production techniques [Tr. 221 (142a), 319 (189a), 335 (196a), 969 (272a)]. For example, in prior techniques for making glass-bonded cores, extremely thin foils had to be produced, measured and sorted to select those suitable for the intended gap size, then cut to size and subsequently carefully manipulated into place on one of the ferrite surfaces, after which the other ferrite surface had to be carefully laid on top [Tr. 208-209 (128a-29a)]. The glass foilsoften varied in thickness [Tr.213 (133a), 294 (175a)], were very small and fragile, and often fractured [Tr. 224 (145a)], necessitating time-consuming reassembling operations. Similarly, methods in which glass coatings were provided over the ferrite parts (by glazing) [Tr. 239 (160a)] required additional time-consuming steps involving subjecting the parts to at least two separate heating cycles, one for glazing and another for bonding [Tr. 263-66 (162a-66a)]. Where the glass was applied in paste or slurry form, it was not practical to provide exactly the proper amount of glass in every instance, and the liquid vehicle for the glass powder could create unpredictable variation [Tr. 264 (164a)]. On the other hand, the Peloschek method merely involves placing shims on one ferrite piece, laying the second piece on the shims, placing on them a weight to hold them in position, and placing

an easily fabricated thin rod of glass at the apex area of the two ferrite parts, followed by heating the assembly to melt the glass to a fluid state. The fluid glass is then drawn automatically into the gap area by capillary action, no additional steps being necessary by the operator.

Still another advantage of the Peloschek process was the automatic formation of a strengthening fillet. When the glass is positioned at the apex of the gap before melting, then any glass in excess of that required for filling the gap automatically provides a fillet of the proper shape and dimensions, enabling reduction of the gap height without weakening the structure [Tr. 303-04 (184a-85a), 590-91 (227a-28a)].

The Peloschek invention thus made possible the manufacture of glass-bonded magnetic heads on a production basis, within the uniform tolerances required. Smaller gap lengths are attainable, accurate within closer tolerances, with far greater reproducibility and fewer rejects. All of these advantages and new results are the necessary consequence of and only made possible by the practice of the very process set forth in the patent claims.

The Impact of the Peloschek Process On the Industry

The impact of the Peloschek invention on the magnetic recording head industry was striking. The following will show that the Trial Court was extremely conservative in saying that the evidence on this point was meager [Opin. 36 (67a)].

Since 1964, the process has been used by Ferroxcube Corporation[1/] in making magnetic recording heads and glass-bonded

1/ Ferroxcube is an affiliate of plaintiff, and a competitor of defendant [Tr. 741 (233a)]. It has received technical assistance from N.V. Philips. [Tr. 745 (234a)].

cores for other manufacturers of magnetic heads, superseding other methods for making such cores [Tr. 841 (250a), 848-55 (251a-55a), 989-90 (277a-78a); PX 100A (337a)]. Since defendant Micronetics was formed in 1969 (largely by former employees, including the former president, of Ferroxcube) it has used this same process.

The same process has been used by IBM [PX 220-3, pp. 7-37 (470a-500a); PX 13 (334a); PX 14 (335a); PX 220-2, pp. 11-21 (456a-66a); PX 37 (336a)] which is licensed under the patent in suit [PX 205]. Indeed, the infringing process of defendant was derived by defendant from former employees of IBM [PX 220-3, pp. 35-37 (498a-500a)]. The same process has been used at N. V. Philips [Tr. 334-35 (195a-96a)], in Europe.

The parties agree that IBM, Ferroxcube and Micronetics supply 70% to 85% of the total glass-bonded ferrite recording heads in the computer industry [Tr. 569-573 (222a-26a), 704-705 (231a-32a)]. Ferroxcube and Micronetics (although together representing only 10 to 15% of the industry) jointly produced over $17 million of glass-bonded ferrite core products from 1970 to 1974 [PX 213 (451a)]. As testified by the Vice President and general manager of the Micronetics division which manufactures such products, there is no known way, other than the patent capillary process, for attaining desired control of the gap length within the specified tolerances and it would be impractical to produce glass-bonded cores by any other process [PX 220-11, pp. 37 (504a), 45-48 (505a-08a)].

Plaintiff's expert[1/] testified that without the Peloschek invention the enormous numbers of magnetic recording heads required

1/ Mr. Otto Kornei had long experience in the field of magnetic recording heads, with the pioneer Brush Development Company and with IBM, [Tr. 27-28 (85a-88a)]. He is also an inventor in this very field [PX 131 (347a)].

in modern computers could not have been produced in an economical way, and that the availability and lower cost of producing these heads contributed substantially to the development of today's computers [Tr. 969 (272a), 1196 (328a)]. This process was a milestone in the commercial development of recording heads [Tr. 1196 (328a)]. Almost immediately after the Peloschek invention this process superseded the previous processes and became essentially the sole commercial process for producing glass-bonded ferrite cores.

The Peloschek process thus attained a high degree of recognition and success in the industry.

<u>The Prior Art</u> (DB 11-16)

Here again defendant's over-simplistic approach, relying more on innuendo than fact, requires a more detailed consideration of the prior art.

Defendant relies upon two groups of prior art. The first group is set forth (DB 11) as "The Prior Art Processes Using Spacers to Define a Gap Between Ferrite Bars in Recording Cores" and defendant discusses three Duinker patents. Actually only a single one discloses spacers at all, and that one uses spacers in a different way from the patent process.

a. The <u>Recording-Head-Making Prior Art</u>

The Duinker '318 patent [DX-H (518a)] is not concerned with and does not disclose spacers at all. As discussed above, it discloses nothing but the bare sandwich technique. Its subject matter was considered by the Patent Office in the first Official Action, and discarded;1/ the Peloschek patent was allowed over it.

1/ The Patent Office cited Application No. 114,273, which matured into patent 3,145,453, a division of Duinker '318 [see file wrapper, PX 146, p. 25 (364a)] and hence has exactly the same subject matter.

Duinker expressly points out the need for uniformity in production, in saying "It is also difficult if not impossible to produce small gap widths (of the order of magnitude of a few microns and to adjust the desired thickness)" [col. 1, ln. 64-72 (519a)]. The Duinker patent represents a process which was inadequate to satisfy the needs of the art, and was subject to the very deficiencies discussed above; it discloses a process which Peloschek et al completely superseded by their solution to the problem. It not only fails to suggest the Peloschek process, but by complete reliance on the sandwich technique directs attention away from it [Tr. 1182-83 (312a-13a)].

The second patent, Duinker '772 [DX-J (525a)], was also cited by the Patent Office and discarded [PX 144, col. 6, ln. 7 (357a)]. It discloses no more than the same sandwich technique as the Duinker '318 patent and has all the disadvantages of that patent. [Tr. 1186-87 (317a-18a)].1/

The third Duinker patent '367 [DX-K (529a)] relied on was also directly considered by the Patent Office and similarly discarded [PX 144, col. 6, ln. 8 (357a)]. It also is concerned with reproducibility of gap size [see col. 2, ln. 19 (530a)] but only discloses essentially the same sandwich method as the Duinker '318 and '772 patents, with an added feature. It discloses that movement - limiting stops (called spacers) may be placed on one of the gap surfaces <u>to stop the movement of the two gap surfaces toward one another</u> when they (theoretically) have arrived at the desired gap length [Tr. 1186 (317a)].2/ Duinker also points out that, even before

1/ Its disclosure of slicing the bars to form individual cores is immaterial, since Claim 6, which recites that further steps, is not urged here as patentable separately from Claim 1.
2/ This '367 patent discloses what may be termed the "limited sandwich" technique, as distinguished from the "uncontrolled sandwich" technique of the previous '318 and '772 patents.

his instant '367 invention, metal or foil spacers were unsuccessfully used to limit the movement of the ferrite pieces toward one another during the squeezing operation; his '367 patent invention was directed to the use of mica as spacers instead of metal, in an attempt to alleviate the problem, which it failed to do.

These Duinker spacers functioned in a distinctly different way from the spacer shims of Peloschek. They served merely as movement - limiting stops to halt the squeezing together of the ferrite pieces [Tr. 214-16 (134a-36a), 1186 (317a)], and only in this broad and general sense were they intended to serve to "determine" or "fix" the final gap length, but in fact were unsuccessful in doing so. This Duinker '367 process still suffered from the very disadvantages faced and overcome by the Peloschek patent in suit:

1. The same gap reproducibility problem existed [Tr. 225 (146a), 966-67 (269a-70a)].

2. The same bubble problem as with the Duinker '318 patent was still present [Tr. 225 (146a), 1187 (318a)].

3. The undesirable consequences of use of high pressure on the ferrite pieces to cause squeezing of the glass were still present [Tr. 216 (136a), 224-225 (145a-46a)].

4. An added problem was caused by the spacers. Since they rested on only one of the ferrite pieces, which were held apart by the previously inserted glass foil (thicker than the spacers themselves), the spacers could not be held positively in place, and the pressure applied to the glass for the necessary squeezing down of the softened glass tended to push out the spacers, so that they did not maintain their position or perform their intended purpose [Tr. 225 (146a)]. Also, the glass

tended to be squeezed in between the spacers and the adjacent ferrite gap surface, which prevented movement of the upper ferrite piece to its desired final position and caused further unpredictable variations in final gap length [Tr. 225 (146a)].

These Duinker patents therefore evidence the unsuccessful efforts of the art to solve the gap reproducibility problem, as the Trial Court found. [Opin. 34,36 (65a, 67a)].

In contrast, no pressure is applied through the ferrite to the glass in the Peloschek process [Tr. 971 (274a), 977-8 (275a-76a)]. The ferrite pieces are relatively immovable [Tr. 966 (269a)], and the spacers are held firmly in position between the ferrite pieces before the glass is flowed in, which prevents the glass from entering between the shims and ferrite pieces [Tr. 319 (189a), 322 (191a); PX 144, col. 1, ln. 47 (355a)]. Peloschek's spacers keep the ferrite pieces <u>fixedly separated</u> and maintain the gap set at the proper value all during the bonding process, both before and during the introduction of the fluid glass. The spacers are the sole means for determining the gap length; it is independent of the glass and of the pressure. The temperature need only be high enough for fluidity and the time only long enough to fill the entire gap [Tr. 319-20 (189a-90a), 970-71 (273a-74a), 1213-14 (332a-33a)]. These differences led to solving the problems of both reproducibility of gap length and bubble-elimination, with high yields, which both the Duinker uncontrolled sandwich technique and the Duinker limited sandwich technique failed to accomplish [Tr. 221-5 (142a-46a), 1186-87 (317a-18a), 1202 (329a), 1213-14 (332a-33a)].

It is noted that the Trial Court said [Opin. 31 (62a)] that the difference in Peloschek's use of shims in presetting the gap and Duinker's use of shims "to keep the ferrite slabs apart during compression" is one "without substance". This is submitted to be clearly erroneous. In Duinker the slabs are initially separated by the glass [as the Trial Court noted, Opin. 33 (64a)] and only one slab is in contact with the shims during the compression of the glass by moving the slabs together until movement is stopped by the shims, at which point the compression ends. Hence, Duinker's shims do <u>not</u> and <u>cannot</u> keep the slabs apart during compression, and the Trial Court's statement to the contrary [Opin. 31 (62a)] is clearly erroneous. This highlights the different functioning of the shims: in Duinker they form stops intended (but in practice ineffective) to <u>halt the movement</u> of the slabs when the exact desired separation is attained, while in Peloschek they serve continuously to hold the slabs apart by the prescribed distance, and <u>prevent</u> movement of the slabs during the entire bonding operation. This is a <u>substantial</u> difference, which contributes importantly to the solution of the problems faced.

Thus <u>all</u> of the asserted prior art processes for making recording head cores were directly considered by the Patent Office and were rejected as not affecting patentability of the Peloschek process. All failed to accomplish the objectives or to attain the results of the Peloschek process. All evidence the failure of the art. They were the very prior art which occasioned the necessity for the Peloschek invention, and which was superseded by that invention.

b. <u>The Capillary-Action Prior Art</u>

The second group of prior art patents is styled by

defendant as "The Prior Art Processes Using the Capillary Process To Fill Gaps" (DB 14). It would be better termed the metal-soldering and epoxy-laminating prior art, to designate their true functioning.

Defendant here relies upon the patents to Grant [DX-G (515a)], DeJean [DX-M (539a)], Lietz (German) [DX-P (549a)], and Reichenbaum [DX-I (522a)].

None of them concerns glass-bonding or glass technology, which the Trial Court expressly found is the pertinent art [Opin. 33-34 (64a-65a)].[1/] None of them concerns the making of bonded cores for recording heads. Their only relationship to the subject matter of the patent is the general use of capillary action to flow molten metal or liquid epox- cement into irregular interstices between metal parts held in contact. They are all from various remote and non-analogous fields which would not be consulted by an ordinarily skilled person in the pertinent art having such problems as reproducibility of gap sizes or bubble-elimination [Tr. 1177 (307a), 1182-93A (312a-25a)].[2/]

Notwithstanding this (and presumably for the sake of a complete response to defendant's contentions) the Trial Court went on to consider those prior art patents.

The Trial Court specifically found that none of this prior art was concerned with attaining precision or reproducibility of gap size [Opin. 32 (63a)]. They involve only soldering parts or joining laminations together by filling of random irregular spaces unavoidably formed when the parts or laminations are placed in direct contact.

The Grant patent[3/] is urged by defendant to disclose a

1/ This is not disputed by defendant. As pointed out below, plaintiff submits that the pertinent art is more limited. See p. 37, fn. 1.
2/ This alone establishes the nonobviousness of using capillary action in a glass-bonded ferrite core process.
3/ Discussed by the Trial Court at pages 29-30 (60a-61a) of its opinion and by defendant at DB 14-15.

magnetic structure consisting of two magnetic pieces separated by a narrow gap of fixed dimension. "Fixed" as used in Grant means permanent [Opin. 30 (61a)], i.e., invariable [Tr. 1177-82 (307a-12a)] and not predetermined or pre-set to a desired length. In fact, the testimony is uncontroverted that Grant is inoperative to do more than fill by molten copper random irregular interstices between an iron plug ("tenon") press-fitted (i.e., forced) in a hole in an iron frame ("mortise") and hence in direct contact [Tr. 1180-81 (310a-11a)].

Contrary to defendant's assertion (DB 14) there is no "fixed spaced relationship"; rather, the Grant parts are "contiguous"1/ and with a "tight pressed fit".2/ There is no spacing whatever; the Grant patent is inoperative to attain such a spacing [Tr. 1178-81 (308a-11a)]. No "gap" is formed between polished gap surfaces, but there are only minute irregular voids between the pressed-together plug and hole, which is certainly not analogous to the desired magnetic recording gap defined in the Peloschek patent.

It is significant that Grant used no spacing members and makes no attempt to create a gap of predetermined size [Opin. 32 (63a)]. His disclosure is totally irreconcilable with use of spacing members, since he relies upon a pressed fit to position the circular plug in the hole, and because his circular plug and hole arrangement would make any uniformity of gap dimension impossible of attainment [Tr. 1179-80 (309a-10a)]. He therefore supplied no suggestion or aid for overcoming Peloschek's problem [Tr. 1177 (307a)].3/

1/ DX-G, col. 1, line 52 (516a); Tr. 1125 (296a), 1177-82 (307a-12a).
2/ DX-G, col. 2, lines 6, 12 and 17 (516a); Tr. 1099-1100 (282a-83a), 1123-25 (294a-96a), 1178-81 (308a-11a).
3/ The circular gap geometry of Grant [See Opin. 32 (63a)] is the antithesis of what is required for magnetic recording. Note that no magnetic recording head in the art cited has other than flat polished gap surfaces.

Moreover, claim 10 does not read on Grant as asserted by defendant (DB 15). There is no "confronting" relationship between polished ferrite gap surfaces as recited specifically in the claim nor are there polished gap surfaces "separated by a gap equal to the desired gap length" in Grant. These terms as used in Peloschek can only mean pre-setting the gap to the final desired gap length by the interposed shims; in Grant there are no spacers and any "gap" size is irrelevant, as the Trial Court found [Opin. 32 (63a)]. In any event, claim 10, by itself, is not critical for decision on this appeal, since a holding of validity of any of the other claims (e.g. Nos. 1-4, 6, 8, 9), even the most limited one, will be sufficient to sustain the judgment below and require denial of this appeal.

De Jean, the German Patent and Reichenbaum also have no concern with the problem faced by Peloschek [Opin. 32 (63a)]. The first two disclose only a method of forming a unitary stack of metal laminations by clamping them flatly together, in direct contact, and cementing them by an epoxy cement which flows by capillary action into the unavoidable irregular random interstices left between the contacting laminations [Tr. 1134-37 (297a-300a)]. The Reichenbaum patent discloses only a conventional metal-soldering technique to adhere a germanium wafer to a copper substiate. Here again the wafer and substrate are in direct contact, and adhered by melted metal solder, without shims.

The Trial Court properly found [Opin. 34-35 (65a-66a)] that none of these prior art patents is directed toward or indicates a solution for Peloschek's problem of attaining reproducible minute gaps within close tolerances. This is even more true with respect

to eliminating bubbles in a glass-filled gap [Tr. 1134-35 (297a-98a), 1187-88 (318a-19a), 1193-93a (324a-25a)]. No spacing members define a pre-set gap of desired gap length, to be made reproducibly within close tolerances, in any of this prior art; in particular, whereas the German patent does have a magnetic recording gap where the problems faced by Peloschek could arise, the German patent fails even to suggest the use of capillarity in filling the recording gap, notwithstanding its use of capillarity for cementing the laminations [Tr. 1137 (300a)].

c. The Prior Art And State of the Art Taught Against Filling Minute Gaps With Glass By Capillary Action

The prior art Zinke German publication cited by defendant,[1/] in a passage understandably not offered by defendant, teaches that, in contrast to metal solder (used in Grant), molten glass remains at the spot it is applied and cannot enter narrow gaps [Tr. 1140-44 (301a-05a)]. Hence it would be unsuitable for capillary action.[2/]

At normal working temperatures, glass cannot flow by capillary action [Tr. 812-14 (242a-44a)]. Higher temperatures, where the glass is more fluid, as needed for capillary action, are contra-indicated because of possibility of formation of bubbles, or glass decomposition, or degrading the ferrite by chemical interaction with the glass [Tr. 787 (240a), 836 (249a)].

Hence the prior art taught against applying capillary action to fill small gaps with glass. Peloschek went counter to

1/ Zinke, "Technologie der Glas Verschmelzungen", DX-R (553a-1).
2/ Defendant's expert Mr. Gallup presumably did not know of this German publication when he testified (Tr. 1110-11 (289a-90a) that he was unaware of any such publication.

the accepted view of the art in evolving the patent process.

d. <u>The Differences Over the Prior Art</u>

The District Court properly found the differences between the patent process and prior art. It found

1. The glass is adjacent the gap, not in it [Opin. 33 (64a), 31 (62a).

2. <u>Both</u> ferrite faces are in contact with the shims, not just one [p. 33 (64a)].

3. No pressure is used to force the glass to fill the gap [p. 33 (64a), 31 (62a)].

4. Capillary action is used to fill the gap.

5. The substance of the invention is directed at attaining reproducible minute gaps within close tolerances [p. 32 (62a)]; in the prior art the precision or reproducibility of the gap is not critical, and only random spaces are to be filled [p. 32 (62)].

Defendant is completely incorrect in contending (DB 13) that these Duinker patents differ from Peloschek <u>only</u> in not disclosing the capillary technique of flowing the glass into the gap. The uncontroverted evidence is to the contrary.

As has been shown above, the Peloschek process is a combination of steps never previously suggested, namely, first fixing the ferrite gap surfaces at the required gap length by spacing members of thickness equal to the desired gap length, placing the glass adjacent but outside the gap, and heating the glass to a fluid state so as to flow into the gap by capillary action, without requiring any movement of the gap surfaces. This is the succinct statement of the differences in the Peloschek invention, rather than defendant's incomplete, self-serving and distorted statement at DB 13.

SUMMARY OF ARGUMENT

The prior art here relied upon by defendant was either fully considered by the Patent Office, or is from technologies not pertinent to the subject matter of the patent. The statutory presumption of validity is thus not only unimpaired but even strengthened.

The "subject matter as a whole" of the patent is not merely the capillary process, but a combination of steps, the important ones of which were new, and which were never before combined or indicated to be combined. These steps included first placing the polished ferrite pieces at a fixed separation by means of spacers equal in thickness to the desired gap length, and thereafter placing glass outside the gap and heating the glass to a fluid state to cause it to flow into the pre-set gap by capillary action to bond the ferrite pieces - the ferrite pieces not being moved during the bonding process.

Evidence is entirely lacking that this subject matter "as a whole" would have been obvious at the time and there is positive evidence to the contrary. Not only are these steps of the process claimed in the patent not disclosed in any of the prior art (and hence not old as argued by defendant), but in addition there is no indication whatever in the art that the problems sought to be overcome could indeed be solved by resort to such steps.

Only by reasoning backward from after-the-event knowledge of the invention can it be seen how and why the deficiencies of the prior practice were overcome. Even if the steps of the process were individually old, the very selection and employment of those particular steps in the claimed process, in the absence of any teaching in the prior art of such selection or use, establishes the statutory nonobviousness.

The non-obviousness is confirmed and strengthened by the existence of the problems and the tools for their solution for nearly a decade, while organizations of high scientific attainment and capability strove unsuccessfully to solve those problems, all proceeding in the different direction of the "sandwich" technique. The non-obviousness is also confirmed and-enhanced by the acceptance of the patent process in the industry.

Defendant has at best shown the availability separately of (some) features of the patent process, but no evidence has been offered (apart from the patent in suit) to show that bringing together these features would have been obvious, particularly to the ordinarily skilled worker in the pertinent art. The Trial Court was correct in ruling that defendant had failed to sustain its burden in this case.

ARGUMENT

As is now shown, a careful review of the evidence will demonstrate that the Trial Judge's holding of nonobviousness is fully supported; his comment [Opin. 34 (65a)] that the question is "a close one" is an expression of conservatism which is unjustified. In any event, that comment applied only before consideration of the sub-tests of failures of the art and acceptance by industry. As the Court held, any "lingering doubt" was washed away by the evidence on the sub-tests [Opin. 37 (68a)].

To present clearly the real issues here, it is believed necessary to give a fresh analysis of the situation, with interpolations as to defendant's pertinent contentions, followed bysome direct refutations of others of defendant's arguments.

I. THE PRESUMPTION OF VALIDITY REMAINS UNIMPAIRED

As pointed out above, all of the prior art relied upon by defendant here which concerns magnetic recording heads was specifically considered by the Patent Office and discarded.

Defendant argues that the failure of the Patent Office to cite the capillary-action prior art weakens the presumption of validity.1/ This argument is fallacious for two reasons:

First, the Trial Court has found [Opin. 33-34 (64a-65a)] that the pertinent art is the glass and glass-bonding art.2/

It is unquestionable that none of the capillary-action prior art concerns the glass-bonding art at all, whether for recording heads or otherwise. All of it concerns either metal-soldering of contacting metal parts (as in Grant and Reichenbaum) or cementing contacting metal laminations into a unitary stack by epoxy cement (as in De Jean or the German patent)3/.

Hence these prior patents are not prior art within the meaning of 35 U.S.C. 103. They are not pertinent, and do not

1/ Sec. 282, Title 35 says: "A patent shall be presumed valid. Each claim of a patent (whether in independent or dependent form) shall be presumed valid independently of the validity of other claims; dependent claims shall be presumed valid even though dependent upon an invalid claim. The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting it."

2/ As shown below, this definition is too broad; the pertinent art is that of manufacturing magnetic recording heads, particularly glass-bonded heads. However, for the present section this definition may be assumed correct; it is not disputed by defendant.

3/ Defendant has merely in passing (DB 20), but incorrectly, asserted that the Hill patent [DX O (548a)] discloses use of the capillary process in the glass-to-metal seal art. The Trial Court found explicitly to the contrary (with more than adequate record support at Tr. 1113-14 (291a-92a), 1189-92 (320a-23a), holding that Hill merely discusses in general terms the physical principle of capillarity, and that glass will behave as a liquid so far as capillary action is concerned [Opin. 28 (59a)]. Since Hill is not discussed by defendant as prior art being relied on, it needs no further discussion here.

impair the presumption of validity.

Second, the very fact that the Patent Office file wrapper does not include reference to the capillary-action prior art, in view of the age and nearly universal knowledge of the capillarity principle (which probably has been taught in every elementary physics course for a century), is an indication that the Examiner, like the Trial Court, considered such prior art to be non-analogous to the present invention and therefore refrained from citing it. It is defendant's burden to prove otherwise, which it has not done.

Hence the presumption of validity, far from being impaired, is reinforced[1/] and defendant has the burden of establishing, by positive and convincing evidence[2/] (not merely by repetition of innuendo or assertions) that the Trial Court did in truth commit a clear error of law in finding the Peloschek patent valid.[3/]

II. THE HOLDING BELOW OF NONOBVIOUSNESS OVER THE PRIOR ART AND ITS BASIS WERE CORRECT

In a careful and well reasoned opinion (based upon findings drafted independently rather than merely adopted from one of the parties) the District Court held the patent in suit to be nonobvious

1/ Steven v. Carl Schmid Inc., 73 F.2d 54 (2 Cir. 1934); Ling-Temco-Vought Inc. v. Kollsman Inst. Co., 372 F.2d 263 (2 Cir. 1967).
2/ Radio Corporation of America v. Radio Engineering Laboratories, Inc., 293 U.S. 1 (1939); Mumm v. Jacob E. Decker & Sons, 301 U.S. 168 (1937); Rich Products Corp. v. Mitchell Foods, Inc., 357 F.2d 176, 181 (2 Cir. 1966), cert. den. 385 U.S. 821 (1966) Trio Process Corp. v. L. Goldstein's Sons Inc., 461 F.2d 66, 70 (3 Cir. 1972) cert. den. 409 U.S. 997.
3/ If any reasonable doubt remains, it is to be resolved in favor of the patent holder. Lemelson v. Topper Corp., 450 F.2d 845, 849 (2 Cir. 1971), cert. den. 405 U.S. 989; Lorenz v. F. W. Woolworth Co., 305 F.2d 102, 105 (2 Cir. 1962); Rains v. Niaqua, Inc., 406 F.2d 275, 278 (2 Cir. 1969), cert. den. 395 U.S. 909.

and hence valid under 35 U.S.C. 103 [Opin. 34 (65a)].

In this decisional process, the Court followed the substance of the analysis of Sec. 103 set forth by Judge Giles S. Rich of the U.S. Court of Customs and Patent Appeals, one of the authors of that section:

> "So, section 103 speaks of a condition of patentability instead of 'invention.' The condition is unobviousness, but that is not all. The unobviousness is as of a particular time and to a particular legally fictitious technical person, analogous to the 'ordinary reasonable man' so well known to courts. To protect the inventor from hindsight reasoning, the time is specified to be the time when the invention was made. To prevent the use of too high a standard - which would exclude inventors as a class - the invention must have been obvious at that time to 'a person having ordinary skill in the art to which said subject matter [i.e., the invention] pertains.' But that is not all; what must have been obvious is 'the subject matter as a whole.'[1/]

In making this decision, the Trial Judge expressly followed the well-known guidelines of the Graham case.[2/] After discussing the patent [Opin. 23-24 (54a-55a)], he considered the scope and content of the prior art [pp. 26-30 (57a-61a)], the differences between the prior art and the claimed invention [pp. 30-33 (61a-64a)], what was the pertinent art and the level of skill in it [pp. 33-34 (64a-65a)], and thereafter he arrived at the proper conclusion that the patent was nonobvious and is valid [pp. 34-36 (65a-67a)]. This was done without initial reliance upon the common sub-tests[3/] for nonobviousness.

1/ "Laying the Ghost of the 'Invention' Requirement", 1 A.P.L.J.24 (1972). Emphasis here and throughout this brief has been added unless otherwise noted.

2/ Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966).

3/ These are termed "secondary" in Graham only to indicate that they are considered after the primary factors, but not because of any lesser importance. (Timely Products Corp. v. Arron, 523 F.2d 288, 294 (2 Cir. 1975)).

In his analysis, the Trial Judge logically started from the nature of the problem to be solved, in accordance with the precept of this Court:

> "Where the invention for which a patent is sought solves a problem which persisted in the art, we must look to the problem as well as to its solutions if we are to properly appraise what was done and to evaluate it against what would be obvious to one having the ordinary skills of the art." (Shaw v. E.B. & A.C. Whiting Co., 417 F.2d 1097, 1104 (2 Cir. 1969) cert. den. 397 U.S. 1076).

The truest test for obviousness is to stand in the shoes of those in the art immediately before the Peloschek patent, and to face the problem which Peloschek faced. As shown above, the problem faced by Peloschek was to achieve production reproducibility of tiny recording head gap sizes within close tolerances (as the Trial Court found) and to eliminate bubbles from the glass in the gap[1/] in the manufacture of recording heads.

The Court found that all the recording head prior art patents followed the sandwich technique which was the very prior art which created the problems Peloschek set out to solve. The Court found specifically that Peloschek accomplished attaining reproducible minute gaps within close tolerances by a process differing from this prior art in that the shims of the desired gap size are maintained in contact with both ferrite faces (so as to pre-set the gap and prevent movement of the ferrite pieces during bonding) rather than with only one face as in prior practice (so that the upper ferrite face moved during bonding), and in that

1/ Although the Trial Court found it unnecessary to discuss the bubble problem, the evidence on it (which is uncontroverted) reinforces the Court's ruling and is properly presented here. Appellee may of course urge any ground supportive of the judgment. U.S. v. Amer. Rwy. Expr. Co., 265 U.S. 425, 435 (1923).

capillary action was used to fill the gap rather than by use of pressure as in the prior art [Opin. 33 (64a)].

The Court went on to find [Opin. 33-34 (64a-65a)] that the art "to which said subject matter [sought to be patented] pertains" (35 U.S.C. 103) is the glass and glass-bonding art.[1/]

None of the capillary-action prior art is directed to capillary flow of glass; all are from the metal-soldering or epoxy-cementing art, and hence irrelevant here. Nevertheless, the Court below analyzed this capillary-action prior art and found that none of it was directed to Peloschek's problem. As the Court found [p. 34 (65a)], only irregular voids were involved in that prior art; their dimensions were not important. The Trial Court further specifically found, on more than adequate evidence, that none of the prior art disclosed or suggested that Peloschek's problems could be solved by resort to capillary action. The Court specifically found:

> "The fact remains that the prior art does not suggest that capillary action would successfully produce gaps of precise predetermined size with reproducibility." [p. 35 (66a)]

and that

> "Nowhere in the prior art references cited to the Court is there any disclosure which would make it clear to one skilled in the art that

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1/ Plaintiff submits that this is an overly liberal and broad finding The uncontroverted evidence establishes unequivocally that the relevant art is that of the manufacture of magnetic recording heads and more particularly glass-bonded ferrite heads. The patent itself states what the art is; it says "The invention relates to a method of manufacturing parts of annular magnetic heads for recording.." Similarly, all claims of the patent are for "a method of manufacturing portions of magnetic heads." The Court found that the patent "addresses itself to the problem of manufacturing magnetic recording heads" [Opin. 23 (54a)]. Plaintiff's expert, Mr. Kornei, with long experience in this field, testified to the same effect [Tr. 29 (87a)]. Defendant submitted no evidence to the contrary. Hence the "art" to be considered within the meaning of Sec. 103 should be limited to magnetic recording heads particularly with glass-bonded ferrite cores. It is submitted to be clearly erroneous to broaden the relevant art to all glass-bonding technology.

> such an application of capillary action would be successful..." [p. 34 (65a)].

in solving the problem faced by Peloschek. This finding is clearly correct. There is no rational relation between capillary action and bubble-elimination. To the contrary, the workers in the art at first believed that the bubble problem might be worsened rather than solved if capillary action were tried [Tr. 474-6 (213a-15a)]. No one, faced with the bubble problem, could rationally consider that capillary action was positively indicated as a solution. The same is true of the gap-reproducibility problem.

Absent such prior art disclosure (or at least suggestion), the Trial Court correctly held that there had been nonobviousness. Even if the separate features of the patent in suit existed in the prior art (which they did not), that would not create obviousness. As Judge Learned Hand said:

> "Substantially all inventions are for the combination of old elements; what counts is the selection, out of all their possible permutations, of that new combination which will be serviceable...." <u>Safety Car Heating & Lighting Co.</u> v. <u>General Electric Co.</u>, 155 F. 2d 937, 939 (2 Cir. 1946).

> "It is idle to say that combinations of old elements cannot be inventions; substantially every invention is for such a 'combination': that is to say, it consists of former elements in a new assemblage." <u>Reiner</u> v. <u>I. Leon Co.</u>, 285 F.2d 501, 503 (2 Cir.) cert. den. 366 U.S. 929 (1961).

As this Court held in the <u>Shaw</u> case, 417 F.2d at 1104:

> "...the burden is on the [defendant] to show <u>facts</u> that would lead to the conclusion that [plaintiff's patent] product was obvious. The mere recital of the known elements in the art does not, without more, invalidate the patent under Sec. 103." (emphasis quoted)

Thus, it is defendant's burden to show more than merely some use of the capillary principle; there must be clear and convincing evidence that the capillary action principle could be and should be utilized to solve the specific problems faced by Peloschek in production of recording head gaps. The clear evidence is to the contrary. Plaintiff's expert, Mr. Kornei,[1/] specifically testified that the cited capillary-action prior art would not be referred to by ordinarily skilled persons faced with Peloschek's problems [Tr. 1182-1195 (312a-27a)]. The level of skill of the art did not extend beyond utilization of the sandwich technique. The Court specifically found lacking any evidence of any suggestion to use a capillarity here, and properly held that defendant had failed to sustain its burden [Opin. 35 (66a)].

The nonobviousness of the patent process is also strengthened by the further fact that the prior art fails to disclose or suggest the further distinguishing feature of the patent process, namely, pre-setting the gap to the required final dimension by holding a pre-dimensioned shim between the polished surfaces before and during bonding, thereby avoiding the prior art established practice that the upper ferrite piece is moved during the bonding, to an indeterminate final position.

Defendant takes liberties with the Trial Court's opinion in asserting (DB 23-24) that the Trial Court "conceded" that the step of using capillarity instead of the "sandwich" process to fill the Duinker gap was obvious. The Court clearly said [Opin. 35 (66a)] that once one concludes (i.e., if one were to conclude) that

1/ He has had over 35 years experience in the recording art and in the development and fabrication of ferrite heads, during the very period of concern here, and has wide acquaintance, with the level of skill of other persons in the field [Tr. 29-31 (87a-89a); PX 130 (339a); PX 131 (347a)].

capillary action can be successfully applied to produce gaps of precise predetermined size with reproducibility then (and only then) would it be obvious how to do so; but the Court specifically found that the prior art did not suggest any such conclusion,[1/] and the Court went on consistently to hold nonobviousness.

It is immaterial that, <u>after</u> one has concluded that capillary action could be successfully applied (to solve Peloschek's problems), and thereby conceived an important part of the Peloschek invention, then how to do it is simple; the absence of any suggestion to do so and the teachings against use of capillarity with glass makes the use of that principle in Peloschek's process non-obvious.

The Trial Judge thus properly applied the correct principles of law to his correct findings, and correctly held the Peloschek patent to be nonobvious and valid.

III. <u>THE HOLDING OF NONOBVIOUSNESS IS REINFORCED BY THE UNSUCCESSFUL EFFORTS OF OTHERS</u>

The Trial Court further held that the holding of non-obviousness was strengthened by failure of others [Opin. 35-37 (66a-68a)]. As shown above, and found by the Court below, the art was trying to make reproducible glass-bonded ferrite cores since prior to 1955,[2/] but failed to solve the problem for at least those seven years. The art did not know better than to proceed along the only available, sandwich-technique, route despite availability of the commonplace capillary-action principle to fill tiny

1/ This is a fact finding supported by substantial evidence which must stand, under the "clearly erroneous" rule, F.R.C.P. 52(a).

2/ As shown above, Duinker specifically recognized the need for reproducibility, both in his 1955 uncontrolled-sandwich-technique patent, and even before his 1958 limited-sandwich-technique patent.

apaces[1] and the long-known wettability of ferrite by glass.

In this further holding, the Court below again carried out the principles set down by this Court. As held by Judge Learned Hand in the Reiner case (285 F.2d at 504) the most reliable way to resolve the obviousness issue is to refer to the earlier work in the art and to the general history of the means available at the time, and to be guided by such signposts as long-felt need, efforts of others, availability of the means, and recognition of the invention thereafter.

The Supreme Court in Graham (383 U.S. at 36) approved those guidelines in referring among other things to long-felt but unsolved needs and failure of others, as relevant indicia to be considered after the preliminary factual determination of the subject matter at issue. In the companion Adams case[2] the Supreme Court concluded that, although the individual elements of the claimed battery were previously known, and although the invention seemed simple, consideration of all the evidence, and particularly the unexpected results, supported a holding of nonobviousness as to the subject matter as a whole.

This Court, in the recent Timely Products case (523 F.2d at 294) (expressly relied on by the Trial Court) renewed the foregoing principles, in saying

1/ Plaintiff agrees with defendant that Peloschek did not invent capillarity (or gravity or electricity or other physical phenomena) and that capillarity is and was "a well understood force (known long prior to Peloschek)" (DB 14). It was also known that glass "wets" ferrite, at least as early as 1953 when Cruel glazed ferrite pole pieces [PX 151-B, (365a)]. It was also publicly known at least as early as 1950 (when the Grant patent issued) that capillarity was a process capable of filling minute spaces (DB 16). But it was not known (and even contra-indicated) that glass could be moved by capillary action through a narrow channel between polished ferrite surfaces to fill the gap bubble-free.

2/ United States v. Adams, 383 U.S. 39 (1966).

"We can conceive of no better way to determine whether an invention would have been obvious to persons of ordinary skill in the art at the time than to see what such persons actually did or failed to do when they were confronted with the problem in the course of their work. If the evidence shows that a number of skilled technicians actually attempted, over a substantial period, to solve the specific problem which the invention overcame and failed to do so, notwithstanding the availability of all the necessary materials, it is difficult to see how a court could conclude that the invention was 'obvious' to such persons at the time."

This Court also there repeated the Supreme Court's admonitions that the all-too-easy slipping into use of hindsight or using the teachings of the invention when construing the prior art (or in combining prior art to reconstruct the invention after the event) should be avoided and that the simplicity of an invention is not the test of obviousness but, far from necessarily leading to a conclusion of obviousness, may be an indication of patentability.[1/] The Court below properly expressly considered and avoided the "snare" and "trap" of hindsight[2/] [Opin. 35 (66a)] as well as the pitfall of mere simplicity [Opin. 36 (67a)].

The holding of the Court below is thus further strengthened by these additional relevant indicia of nonobviousness.

Defendant's effort to disparage the evidence on this point must fail because of the strength of that evidence.

What would have been obvious is best shown by the history of the art - that is, what workers of even more than ordinary skill actually did, before and after the invention. What was the level of skill in the art is best shown by what was actually done in

1/ See Diamond Rubber Co. v. Consol. Rubber Tire Co., 220 U.S. 428, 434-35 (1911); Goodyear Tire & Rubber Co. v. Ray-O-Vac Co., 321 U.S. 275, 279 (1944); the Shaw case, 417 F.2d at 1104-05; Ches. & Ohio Rwy. Co. v. Kaltenbach, 95 F.2d 801, 804 (4 Cir. 1938).

2/ Chief Judge Coffin, the First Circuit Court of Appeals, in Sylvania Elec. Prod. Inc. v. Brainerd, 499 F.2d 111, 112 (1974).

attempts to obtain suitable ferrite recording heads.

As shown above, in 1953, the direct way to Siemens & Halske for spacing the ferrite pole pieces by glass was to interpose a thin foil or plate of glass between the pole pieces and cement it in place. The way apparent to Cruel in 1953 was to coat the ferrite pole pieces with glass by a glazing process, and then clamp them together. In 1955, the way thought of by General Electric Company was to bond the ferrite pole pieces together by glazing.

In 1955, Duinker of N.V. Philips specifically directed his attention to a method of manufacturing recording heads to overcome the problem that it was "very difficult if not impossible to produce small gap widths... and to adjust the desired thickness" [DX-H, col. 1, ln. 68 (519a)], which is the very problem faced by Peloschek still later. Duinker's effort to solve this problem was by the glass-foil sandwich technique.

When these methods were found not satisfactory, the workers in the art attempted improvements upon them, but without altering the basic sandwich process. In 1958, Camras of Armour Research Foundation of the Illinois Institute of Technology was still suggesting using low-melting point glass as an adhesive to bond the ferrite pieces, like the GE process. By 1958 Duinker of N.V. Philips still said that "the adjustment of the gap length to the proper value is not possible", and that even the previous use of metallic foils or wires as movement-limiting spacers was not successful [DX-K, col. 1, ln. 49-64 (530a)]. He still spoke of "difficulties of adjusting the gap length to the correct value." Neither the cause of these difficulties nor Peloschek's solution

were obvious then;[1] he suggested the use of mica for the spacers, which was also not successful.

In 1961 Vilensky of Ampex Corporation was still using the glazing technique, by coating ferrite pieces with a dried glass suspension, then placing the ferrite pieces together with the glass in between, and heating to soften the glass and bond the ferrite pieces. Also in 1961, Pfost of Ampex Corporation addressed the same problem as Peloschek. Pfost expressly sought "a method for manufacturing ferrite core magnetic heads by mass production methods wherein all the heads have substantially <u>the same precise configuration</u>" (DX-L, col. 1, ln. 57 (536a)]. However, what was apparent to him was but another variation of the sandwich technique; he described glazing one ferrite piece, with the added feature of putting silicon monoxide ribs on the other ferrite piece to act as a movement-limiting stop when the ferrite pieces were opposed and the glass softened by heating. IBM also followed the sandwich technique; as late as 1962 it sought to improve that process by providing grooves on the ferrite faces to improve the distribution of softened glass over the surface.

Philips up to 1962 further made a variety of efforts to make the sandwich process suitable for production, including many modifications of the "filling" of the sandwich, such as substituting for the glass foil being sandwiched between the pole pieces (a) a glass rod, (b) a dumb-bell-shaped glass foil, (c) pre-glazed or deposited glass emulsions, (d) foils made of glass particles with an organic binder, (e) glass fleece or (f) an organic adhesive

1/ Duinker himself was of more than ordinary skill. He received over 20 patents for work on magnetic recording heads [PX 159 (442a), Tr. 894-95 (261a-62a)].

layer with glass powder on it; and in addition Philips made various efforts to control the conditions of the process, such as bonding temperatures or thermal pre-treatment of the ferrite [See DX-U1E through U6E (583a, 557a)].

All these prior patents show continuing efforts to improve the manufacture of glass-bonded heads, but without recognition of the key features only later supplied by Peloschek. Thus, from at least 1955 on, the art specifically sought manufacturing processes for attaining precise gaps, and defendant is incorrect in urging (DB 29-32) that others were not endeavoring unsuccessfully to solve the problem.[1/] None of these efforts produced a process which could reproduce the minute gap lengths between polished ferrite faces with close tolerances, without bubbles, and with high yields. The variety and number of these efforts show the difficulties being experienced by the workers in the art, not only of ordinary skill but at the inventive level, with the resources of substantial and leading companies and institutions.

During all this time, the capillary principle was well known. The very Grant patent relied on by defendant here was publicly available in 1950, even before all the above-described efforts in this art. Also, the wettability of ferrite by glass was equally known, not only from Duinker, but even from the earlier Cruel 1953 publication.

The overriding consideration here is that <u>none</u> of the workers in the art, for nearly a decade, despite their struggles to produce a viable process, and despite the availability of the

1/ Moreover, defendant incorrectly says that the Trial Court relied only on four prior patents; footnote 7 [Opin. vi (80a)] makes clear that 6 prior patents were considered.

capillary principle and of the wettability feature, thought of what defendant in its necessary desperation now contends was obvious, namely, completely departing from the sandwich technique, and fixing the ferrite pieces in advance at the required minute gap size with the gap empty, by spacer shims held between the polished ferrite pieces, and thereafter causing fluid glass to be inserted by the use of the capillary principle, without needing to disturb or move the ferrite pieces.

It is clear that <u>if</u> the Peloschek process were in fact obvious, as defendant has to contend here, it would have been adopted even before Duinker's work in 1955. There would not have been a decade of effort in the uniformly fixed direction of the sandwich technique, resulting in numerous inventions, patentable and otherwise, as evidenced by this state of the art, but all without solving the problems of both close reproducibility of gap size and elimination of bubbles.

This evidence demonstrates that the Trial Court's specific finding of long and unsuccessful efforts of others is fully supported by and required by the record, and is not "clearly erroneous". The evidence here reinforces and upholds the Trial Court's ruling of nonobviousness, even if any residium of doubt might have remained.

IV. THE HOLDING OF NONOBVIOUSNESS IS STRENGTHENED BY THE ACCEPTANCE OF THE PELOSCHEK PROCESS IN THE INDUSTRY

The evidence of acceptance and impact of the Peloschek process is detailed above. It shows that 70 to 85% of the glass-bonded ferrite cores are made by the Peloschek process, and the rest may well be. At least $17 million of sales of products made by the process is shown, leading to successful use of at least

hundreds of millions of dollars of computer disc files.

Its substantial contribution to the development of today's computers is shown by its key role in producing the enormous numbers of recording heads required in modern computers, and by its appropriate characterization as a milestone in the commercial development of recording heads.[1/]

This evidence is submitted to be far from "meager", despite the Trial Court's comment [Opin. 36 (67a)], and to be entitled to much more than "not great weight" [Opin. 37 (68a)]. This is clearly a further relevant indicium of nonobviousness and further reinforces the holding of validity.

V. DEFENDANT'S ARGUMENTS FAIL TO ESTABLISH OBVIOUSNESS

It is striking that, despite repeated protestations of obviousness, defendant offers little if any positive evidence. Indeed, defendant's attitude through its brief appears to be that plaintiff is expected to prove non-obviousness! The statutes and the decisional law are of course to the contrary.

The main thrust of defendant's argument (DB 20) is based upon false premises, and therefore the entire argument fails.

Defendant argues that Peloschek "simply used an old and well-recognized [capillary] process" (p. 20) and "did nothing more

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1/ As Judge Learned Hand said many years ago:

> "The value of an invention gets its safest test from what those think of it who are looking impartially for the best thing-they can get for their purpose; when they have so decisively declared against the old forms and for the new, no trials on mice or selected panels account for anything whatever." Chadeloid Chem. Co. v. Wilson Remover Co., 220 Fed. 681, 682 (SDNY 1915).

This principle was reaffirmed by this Court in approving the statement that:

> "Recognition by the trade is the best and most persuasive evidence that can be offered". Georgia-Pacific Corp. v. U.S. Plywood Corp., 258 F.2d 124, 134 (1958).

than to substitute the conventional capillary - fill process in the conventional "sandwich process", and merely "collected together what others had done" (p. 21). All of this is factually incorrect and contrary to the evidence, as well as insufficient in law.

a. <u>The Claimed Peloschek Process Differs Substantially From The Prior Art</u>

There are a number of substantial differences between the Peloschek process and the prior art which defendant fails to set out, and it was exactly those differences which created the unexpected and advantageous results attained by the patented process. Thus:

1. In Peloschek, the gap is pre-set at the final desired size before bonding, when still empty. The spacing members are placed on one polished ferrite pole piece, and the other polished pole piece is placed on the spacing members, opposed to the first pole piece, to create the gap at its final desired dimension, before any glass is introduced, and before the bonding operation starts.

> In <u>all</u> the prior art, the glass is first placed on one gap surface, and the other gap surface is placed <u>on the glass</u>. The gap surfaces are <u>not</u> at their final spacing, but at whatever spacing the glass thickness determines. Even where movement-limiting stops are used, the gap size is not initially determined by the limiting stops but by the glass.

2. The glass is then placed <u>adjacent</u> to the gap.

> In all prior art, the glass is sandwiched <u>within</u> the gap as the gap surfaces are placed in opposition to one another.

3. The spacing members are in contact with both of the polished gap surfaces throughout the bonding operation, and fix the gap spacing throughout the process, so that the pole pieces do not move relative to one another during bonding, as a consequence

of item 1.

> In the prior art, during bonding the spacing members merely sit on one gap surface while the glass is being squeezed (often resulting in squeezing out the spacers or forcing glass in between the spacer and gap surface) and in practice did not determine the size of the gap spacing since the fluid glass unavoidably flowed between the spacers and gap surface. In all prior art, the pole pieces move toward one another, to force the glass into contact with the gap surface for bonding, and to squeeze out air and extra glass.

4. No pressure <u>on the glass</u> is needed or used.

> As the Trial Court found [Opin. 31 (62a)] the prior art used pressure to fill the gap.

5. Any pressure used <u>on the pole pieces</u> may be and in practice is slight, being sufficient merely to keep the spacing members between the pole pieces and to inhibit the flow of the glass between the spacing member and the pole pieces.

> In all the prior art, relatively high pressure (Pfost speaks of 3000 pounds per square inch)[1] is needed to bond the ferrite to the glass, to squeeze out the excess glass and to attain the final pole piece separation. Peloschek's pressure may be only 1/5 to 1/10 as much.

6. The gap is filled by capillary flow of fluid glass.

> In all the prior art magnetic head patents, the gap is filled by external pressure applied to the glass.

7. The glass is melted to a fluidity sufficient to cause capillary flow into the minute gap.

> In the prior art patents, the glass is only softened rather than melted to the fluidity needed for capillary action. The viscosity of glass at its normal working temperature is from 10 to 100,000 times the viscosity of glass at the melting range.

1/ PX 151-M, Col. 4, lines 61-66 (435a).

Each of the foregoing features is either explicitly recited in the claims, or is a direct consequence of the claim recitations.

Thus, claim 1 recites placing on one polished pole piece surface the spacing members having a thickness equal to the desired gap length [PX 179, step a (445a)] and placing the other polished pole piece on the spacing members to form the gap (step b). This is Item 1. The claim then recites placing the glass adjacent the gap (step c). That is Item 2. The claim then recites heating to cause the glass to melt and flow by capillary action (step d). This is Items 6 and 7.

The absence of pole piece movement and the continuous contact of pole pieces with spacing members (Item 3) are a consequence of steps (a) and (b). The absence of pressure on the glass (Item 4) is a consequence of all the steps. The pressure on the ferrite (Item 5) is recited in claim 4; the need for but slight value is a consequence of steps (a) and (b).

It is these very differences from the prior art, directly claimed as the invention, which create the unexpected results attained by the process namely:

a) The desired gap lengths (even as small as 50 to 100 millionths of an inch) are attained within close tolerances (even as small as ten to twenty millionths of an inch).

b) The difficulties incident to creation of bubbles are removed.

c) Difficulties due to pressure breakage of bonded bars are removed.

d) Yields of 90% are attained.

The Trial Court expressly found that the patent teaches both pre-setting the gap <u>plus</u> flowing glass into the gap by capillary action [Opin. 23 (54a)]. The Court held that "the crucial feature" is "the use of <u>capillary action</u> to fill a preset gap..." [Opin. 34 (65a)]. Defendant therefore is incorrect in urging repeatedly that the Peloschek process does no more than use the conventional capillary process (DB 1, 13, 17-18, 21).

Hence, defendant's basic premise is false, and its conclusion is accordingly fallacious. The patent process is not formed of old steps, but is a combination of <u>new</u> steps, producing new and unexpected results, which the prior art failed to attain. Such differences and such unexpected results are strong indicia of nonobviousness here, and strongly support the Trial Court's holding.

b. The Peloschek Process Would Be Nonobvious <u>Even If Its Individual Steps Were Separately Old</u>

Even if pre-setting the gap (i.e., interposing predimensioned spacers between the ferrite pieces and holding the assembly immovable during bonding) were old (which it is not), its use together with the old principle of capillarity would be patentable under the established rule of law.

As held by this Court in the <u>Shaw</u> case (417 F.2d at 1104-5):

> "The mere recital of the known elements in the art does not, without more, invalidate the patent under Section 103. There must appear evidence that <u>the bringing together</u> of these elements would have been obvious. Doubt as to validity, no matter how strong, cannot justify resort to unfounded assumptions or supply deficiencies in the factual background" (emphasis quoted).

Even if the essence of the Peloschek invention does not lie in the individual steps, since it "rather, consists of combining the steps in an unsuggested manner into a process which [achieves] a substantially different function and result from the other processes [of the prior art] of which the individual stages were a part," it is nonobvious and patentable. (Trio Process case, 461 F.2d at 71-72).

35 U.S.C. 103 requires consideration of the subject matter "as a whole", not just of individual steps. The pertinent inquiries should lead to a decision as to whether combining of particular elements, even if previously known, in the specific manner of the invention, out of all other known combinations, in a "new concourse", would have been an obvious thing to do to a person of ordinary skill in the art (See Reiner case, 285 F.2d at 503, and Safety Car Heating case, 155 F.2d at 939, quoted above). It is the selection and employment of those elements in the claimed combination that must be scrutinized as to obviousness (B.G. Corp. v. Walter Kidde & Co., 79 F.2d 20, 22 (2 Cir. 1935)).

These were the very considerations taken into account by the Trial Judge.

The Trial Court expressly found, on positive evidence, that the teachings of Grant or the other capillary-action prior art, that capillary action may be used to fill random irregular interstices, in metal soldering or epoxy-cementing of parts in direct contact, would not suggest to a person in the glass-bonding art that the problem of attaining reproducibility of gap length in ferrite head manufacture could be solved by use of capillary action. The problem faced was not merely one of inserting glass into a small

gap, but of attaining high yields by bubble-elimination and reproducibility of gap size within strict tolerances.

There is no suggestion anywhere in the art to use the flowing of glass into the gap by capillary action to accomplish these results. On the contrary, the art discouraged the use of the capillary principle with glass. As pointed out above, the 1961 Zinke publication (just before Peloschek made the patented invention) expressly taught that glass was not suitable for capillary action. The inhibitions discussed above against use of very high temperatures for glass (necessary for capillary flow), because of bubble-formation or degradation or chemical interaction with ferrite, also made capillary action with glass contra-indicated.

Such deterring factors are strong evidence of non-obviousness (U.S. v. Adams, 383 U.S. 39 (1966)).

Defendant exaggerates the testimony of its expert in urging (DB 24) that he testified that the use of the capillary process to fill "the core gap" (presumably in Duinker) would have been obvious and routine to any skilled person. Any such testimony would be suspect, in view of the obvious fact that in Duinker the glass is already in the gap, so no capillary action is needed or indeed could be had, because the glass already present and the pressure being applied to it during bonding would prevent any other inward glass flow from outside the gap by capillary action. Mr. Gallup testified only that he was ignorant of any publication which would discourage use of capillarity with glass and that, in the light of the capillary-action prior art, if asked to consider processes for filling a small gap with glass he (an expert) would have considered capillarity. This is not proof as to what an ordinarily

skilled person in the art would consider. Moreover, he nowhere contradicts the Trial Court's finding [Opin. 34 (65a), 35 (66a)] that the capillary-action prior art fails to suggest that an application of capillary action would be successful in solving Peloschek's problems, or would successfully produce recording-gap reproducibility. In particular, Mr. Gallup significantly failed to suggest any obviousness in pre-setting of the gap as a step in attaining gap reproducibility. In effect, Mr. Gallup did no more than say that it is easy to unlock a safe when the combination is known, but he did not go so far as to say that here the prior art revealed the combination; only impermissible hindsight could do that. Defendant's argument here "is an example of that type of reasoning which assumes, because it is easy to follow a blazed trail, that it is also easy to make one." Kelley et al v. Coe, 99 F.2d 435 (DC Cir. 1938).

Plaintiff's witness, Dr. La Course, did not agree with defendant's contention here (contrary to DB 14). He was not in the field at all at the relevant time (1962), and had not done work on capillary action [Tr. 815 (245a)].[1/] He testified only that it would not be obvious to insert glass at its normal working temperature [Tr. 813 (243a)] but that it could be done if the glass were made much less viscous than at the melting point, by increasing its temperature [Tr. 814-16 (244a-46a)]. He further did not testify that it would be obvious to use glass at such higher temperatures.

There was further proof of nonobviousness in the testimony of plaintiff's expert, that the capillary-action prior art

1/ Defendant objected to him as not skilled in the art at the time the invention was made, since he entered the glass technology field only in 1966 [Tr. 810 (241a)].

would not suggest use of that principle to solve Peloschek's problem [Tr. 1177-96 (307a-28a].

Indeed, the nonobviousness of use of capillarity in filling the magnetic head gap is emphasized by the cited German patent itself. There, capillarity is used only for cementing the laminations by epoxy adhesive; were its use obvious, at the critical magnetic head recording gap, as defendant contends, it would have been also used there, but it is not.

Even if defendant's version of the evidence should be accepted, on what is at the very least somewhat conflicting evidence, the Trial Court found that the capillary-action prior art did not suggest the use of capillary action for Peloschek's purposes. This finding repudiated defendant's version of Mr. Gallup's testimony, and, being supported by substantial evidence, is not "clearly erroneous" within Rule 52(a) and may not be overturned.

This necessarily led the Court below to the correct conclusion of nonobviousness.

c. No Synergistic Effect Is Required, But Even If Required It Is Present

Based upon these same unfounded premises and fallacies discussed above, defendant urges that the patent process fails to provide the "synergistic result" said to be required by the Supreme Court. This again is incorrect; no such "synergism" is required here, but, if required, it is present.

By defendant's own submission, this requirement of synergism is limited to instances where there is a combination of old elements. Not only do we have here a process, rather than a combination of elements, but also, as already shown, the present

process combines new features in its steps, so that any requirement for "synergism" becomes inapplicable and immaterial.

However, even if synergism should be held necessary,[1/] it exists here.

"Synergism" is a term of clear meaning when applied to chemistry or physiology. It is easy to see "synergism" when a drug A produces, say, a 10% improvement, and a drug B a 15% improvement, but their simultaneous effect is a 50% improvement.

However, it is not certain what would be meant by this term as applied to mechanical or physical rather than chemical or biological matters. It could be argued that a gear always acts only as a gear, a lever only as a lever, etc., and each works only in its known way and contributes only its own effect to an overall device; if so, there is no synergism since the entire effect is the sum of the partial effects. A legal requirement for synergism in such a case is self-defeating, since then no new machine (e.g. an automobile automatic transmission formed of gears and levers) could be patentable. But it is recognized that combinations of old elements can be patentable (Safety Car Heating, Reiner and Shaw cases, above).

In mechanical or physical situations, like the present, "synergism" can have significance only as a figure of speech to designate the need for an unexpected result, different in nature from the individual effects of the elements. Defendant appears to agree with this interpretation (DB 22).

Here, even if defendant's unsupportable argument were accepted, that the patent process includes only old features,

1/ It is to be noted that "synergism" is not mandated by the statute; Sec. 103 of Title 35 requires only nonobviousness, whether synergism may exist or not.

that process nevertheless produces unexpected results, so that "synergism" exists.

It was not reasonably to be expected that using capillary action with the other features of the patent process would result in attainment of gap reproducibility within close tolerances.

It was not reasonably to be expected that such use of capillary action would eliminate bubbles in the glass. (As shown above, the workers on this very project were dubious about such results.)

It was not reasonably to be expected that such use of capillary action would reduce breakage of bonded bars.

It was not reasonably to be expected that such use of capillary action would increase yields from a 5% value to 90%.

Such unexpected results, which are a consequence of the use of the patent process, establish "synergism" here. Whatever "synergism" may mean, it is either inapplicable here or else exists here. This demonstrates both nonobviousness and patentability.

VI. THE PATENT PARTICULARLY POINTS OUT AND DISTINCTLY CLAIMS THE INVENTION

Defendant, at DB 33, under "Point II" brings up a sheer afterthought, not urged to the Court below, or even stated among the issues originally designated on this appeal.[1/] Defendant

1/ This point was not treated by the District Court because never before urged. Reference is made to defendant's Proposed Findings of Fact to the District Court, which fail to mention this point at all. When pressed to state the issues on appeal, in accordance with Rule 30(b), Federal Rules of Appellate Procedure, defendant's counsel in a letter dated April 27, 1976 addressed to plaintiff's counsel, stated "The sole issue appellants will raise on appeal is whether the claims of the Peloschek et al patent 3,246,382 are invalid as obvious pursuant to 35 U.S.C. 103." A copy of that letter is annexed as Attachment B to this brief. This point should be summarily denied on this ground alone.

incorrectly contends that the patent claims fail to particularly point out and distinctly claim the inventive subject matter.[1/]

This contention is sheer fabrication. The claims clearly specify those essential features which necessarily attain the strikingly successful results of the patent, namely, the recording gap reproducibility and the bubble elimination. Those features are the combination of pre-setting of a gap by a pre-dimensioned spacer held between polished ferrite pieces plus the introduction of the fluid glass from outside the gap, by capillary action. As shown in detail above, it is the combination of those two features which provided the solution to the problems faced, and those features are clearly and directly spelled out in the words of the claims.

Every claim spells out not only the capillary action but also the pre-dimensioned spacing members which pre-set the gap to the desired length; claims 1-4 and 6 do so by direct language while claim 10 does so by necessary implication. The gap is thereby "preset", just as the Trial Court found [Opin. 23 (54a)], and the reproducibility is a necessary consequence of what is claimed.

Defendant misconstrues the Trial Court's decision in urging (incorrectly) that the only distinction on which the Court rested validity was not claimed (DB 17). The basic position of the Trial Court was that there was no suggestion in the art to make use of the known capillary principle to solve Peloschek's problems, namely, to attain the results of gap reproducibility and also bubble-elimination. The patent specifically claims the particular steps

1/ On a related contention, the Trial Court expressly found that the patent claims "more than adequately inform those skilled in the art how to practice the invention and how to avoid infringement,.." and hence are in proper compliance with 35 U.S.C. 112.

by which those results were attained, i.e., presetting the gap by the predimensioned shims, and introducing glass from outside the gap, by capillarity: the Court specifically found [Opin. 23 (54a), 34 (65a)] that those features were the substance of the patent invention, and they create the results which the art was unable to attain for a decade.

Defendant argues incorrectly (DB 25) that the present invention is but a new use for an analogous process. The Trial Court effectively found that the prior capillary-action art is not analogous, because the pertinent art is glass-bonding technology. However, even if defendant's assertion were true, this argument begs the question here, and is immaterial, since as Judge Kaufman said in Zoomar Inc. v. Paillard Products, 152 F.Supp. 328, 331 (SDNY 1957), the discovery of a new use for a known process may be patented if 35 U.S.C. 103 is satisfied. The basic question therefore reverts to obviousness, not merely whether the use or the process is new.

Defendant's argument at DB 35 concerning a 40% gap length variation is a fabricated "straw man" and another fallacy. Plaintiff does not "claim... invention in the concept of gap precision" as here urged, but in the combination of steps which permit attaining such precision. The mere fact that in a few isolated instances a customer specified and was willing to accept a $\pm$ 20% tolerance (not 40% as noted by defendant) has no logical relation to the fact that, in actually making such a product, defendant did use the patent process which permitted attaining higher precision than the customer required. This very argument illustrates the lack of rationality in

defendant's frantic effort to avoid the consequences of its piracy.

The precedents cited by defendant cannot be distorted so far as to support defendant's contentions. Neither their holdings nor the isolated statements quoted out of context support defendant's contention that advantages must be stated in the claims. The advantages of an invention are rarely if ever recited in the claims, since no patentable weight is accorded to such a recitation[1/] and there is no statutory requirement that the claims do so. Sec. 112 does not so require; it merely requires that the subject matter of the invention (not its advantages) be distinctly claimed and pointed out. This is fully satisfied where the benefits of the invention necessarily flow from what is claimed, which is the exact case here.

Defendant seems to be in agreement in saying "The claims must include the features which are relied upon to distinguish the 'invention' over the prior art." That is exactly the case here: the claims specifically recite the pre-dimensioned spacing members which pre-set the gap between the polished ferrite pieces, and specifically recite heating the glass outside the gap to flow in by capillary action. These features in combination constitute the invention, produce the advantages, and are expressly claimed, and no prior art discloses them or that they should be combined.

1/ And if so done is subject to criticism as claiming but the function of the invention (Manual of Pat. Examining Proc., Sec. 706.03(c) annexed as Attachment C). See also Knapp v. Morss, 150 U.S. 24, 227-8 (1893): "The use and purpose sought to be accomplished by the Hall patent was the radial expansion of the dress form, but it is well settled by the authorities that the end or purpose sought to be accomplished by the device is not the subject of the patent... in other words, the subject of a patent is the device or mechanical means by which the desired result is to be secured."

In particular, as the Trial Court found, the Grant patent fails to set a predetermined gap [Opin. 32 (63a)] and Grant also fails to teach that he might solve the problem of recording-gap reproducibility by pre-setting the gap by shims and thereafter flowing in glass by capillary action [Opin. 34-35 (65a-66a)].

The recording head prior art did not pre-set the gap. There was thus no fixed gap which the capillary-action prior art could be used to fill, even if there were such a suggestion. The combination of the two types of art makes no sense: the Duinker patents had no need of capillary action, because the glass already more than filled the gap (requiring squeezing out the excess). There was no point in trying to combine the capillary-action prior art with the recording head art - they just were not compatible. Defendant's argument comes down to a bad hindsight reconstruction in an attempt to rationalize a basis for asserting obviousness.

As the Trial Court properly observed, there is "always perfect vision of hindsight". However, that is a "snare" and "trap" to be avoided. This Court must stand in the shoes of the ordinarily skilled person in 1962, to see what he knew of relevance to the matter, and to determine what he would do with what he knew.

The present situation is closely analogous to that in Lyon v. Bausch & Lomb.[1/] There, the only advance lay in keeping an optical surface heated while being coated by certain reflection-preventing substances. This simple expedient resulted in forming a hardy, tenacious coating as competent workers in the field had sought for years, by a number of attempts, none satisfactory, although meanwhile "nothing in the implementary arts had been lacking to put

1/ 224 F.2d 530 (2 Cir. 1955, L. Hand, C.J.).

the advance into operation." When Lyon's solution appeared it supplanted existing practice. Judge Learned Hand held that contribution patentable.

The present situation is also analogous to the Eibel process case.1/ There, a simple change in raising one end of a paper-making machine to allow gravity flow of the paper-containing liquid permitted a major change in speed and hence of economy of production. The lower court considered that an obvious application of the principle that water will run down hill, precluding patentability. The Supreme Court held that Eibel was not trying to patent gravity, but had discovered the reason for limitation of speed of the prior machine. Even though the means for overcoming the limitations were at hand and obvious to use when the way was pointed out, the improvement was patentable.

In the present case also, the advance was deceptively simple, amounting to maintaining the ferrite pieces in fixed relation by predimensioned spacing members at the ultimate required spacing before and during the bonding operation, and introducing fluid glass by the known principle of capillary action (although the principle had not been previously applied to glass, where it was contra-indicated). Here also, Peloschek discovered the reason for prior difficulty, and his apparently simple expedient produced long sought-after results, of reproducibility of gap length within close tolerances and bubble-free gaps, with high yields. Here, also highly competent workers had sought such results but failed, and here also the industry adopted the process. All the factors are analogous, and as in Lyon or in Eibel Process the Peloschek patent is valid and

1/ Eibel Process Co. v. Minn. & Ontario Paper Co., 261 U.S. 45 (1923).

holding below should be affirmed.

CONCLUSION

As stated in the leading patent law treatise Deller's Walker on Patents (2d Edition, 1964, Vol. 1, pp. 44 and 45):

> "A patent is not a monopoly - it is not a grant made in derogation of some common right. The patentee takes nothing from the community - he is a great public benefactor, because he gives to the community his invention for the reward provided by the statute in the form of letters patent granted to him, which is, in effect, a contract between the inventor and the public. Such a contract is a bargain with the public, to be supported on the ground of mutual considerations, and is to be construed on the same principles as control the construction of all contracts, each having rights and interests therein."

While there has been a tendency to overlook these fundamental principles in recent years, in the maze of technical defenses which have been urged, the present case constitutes a classic example of an invention which constitutes a major contribution. The patentee here has been a substantial benefactor to the magnetic head and computer industry, and thereby to the public.

The patentee has not sought to exclude the public from either the public domain technology or the new patented invention, but has rather sought to increase public benefit from expanded use of the invention by offering it widely to all, on terms calculated to yield a reasonable reward provided by the statute and commensurate with the benefit afforded by the invention. Defendant has spurned all such proposals, and has chosen to drag out prior art from remote corners to justify its piracy of the patent invention. As the Seventh Circuit Court of Appeals said, in Ric-Wil Co. v. E.B. Kaiser Co., 179 F.2d 401, 404 (19[illegible]):

> "...The prior art upon which defendant now lavishes its praise was apparently permitted to lie dormant

> until the exigency created by a suit for infringement required its resurrection. Defendant's imitation of the patent structure is another indication of invention."

It has been held and is now conceded that defendant has imitated and appropriated plaintiff's process. As this Court quoted approvingly in the Shaw case (417 F.2d at 1106):

> "The imitation of a thing patented by a defendant, who denies invention, has often been regarded, perhaps especially in this circuit, as conclusive evidence of what the defendant thinks of the patent, and persuasive of what the rest of the world ought to think. Kurtz v. Belle Hat Lining Co., 280 F. 277, 281 (2 Cir. 1922). Accord, Ling-Temco-Vought, Inc. v. Kollsman Instrument Co., 372 F.2d 263, 269 (2 Cir. 1967)."

The Ninth and Fourth Circuits have concurred with this Circuit in holding that copying is evidence of "invention" (Troy Co. v. Products Research Co., 339 F.2d 364, 367 (9 Cir. 1964); Ackermans v. Gen. Motors Corp., 202 F.2d 642, 645 (4 Cir. 1953), following the lead of the Supreme Court in the Diamond Rubber case, 220 U.S. 428 at 441 (1911).

By giving the patent process the tribute of its imitation defendant has recognized the merit of the invention.

In essence, defendant protests long and loud for obviousness, but without support from the record. Defendant has failed to carry the burden of proving either that the essential steps of the patent process are old or any suggestion that they should be combined.[1/]

Bearing in mind the admonition that neither hindsight nor simplicity is a proper basis for denying patentability, and that knowledge after the event is always easy,[2/] it is submitted that the Trial Court was correct in concluding that the differences

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1/ Here, this Court must view the evidence with light most favorable to the party who prevailed below, who should be given the benefit of all reasonable inferences.

2/ Shaw case, 417 F.2d 1097 at 1106; Goodyear Tire case, 321 U.S. at 279.

between the subject matter of the Peloschek patent "as a whole" and the prior art (particularly the <u>relevant</u> prior art) would not have been obvious at the appropriate time to an ordinarily skilled person. That conclusion is fully supported by the following:

1. The prior art on magnetic heads [DX H, J and K (518a, 525a, 529a)] all depended upon moving the ferrite pieces to squeeze the softened glass under pressure down to the requisite thickness to arrive at the final gap length. There was no suggestion in the art to eliminate the squeezing of the glass or to space and hold the ferrite pieces in fixed relation by shims to pre-set the gap to the required size independently of the glass, and only thereafter to flow in the glass in fluid form. Such suggestions constituted a radical and nonobvious departure from the teaching of the prior art.

2. An ordinarily skilled person in either the magnetic head art or the glass-bonding art would not seek solutions to the problem of gap-reproducibility to close tolerances or to the problem of bubbles in a glass-bonded core, by recourse to such a remote art as metal-soldering or epoxy-laminating, which are not in fields analogous to the recording head field and which do not have such problems.1/

3. It was unexpected that combining the concept of gap presetting with capillary action would attain a solution to the gap-reproducibility and bubble problems, and produce yields of 90%2/.

1/ As the Second Circuit said in <u>Bragg-Kleisrath Corp.</u> v. <u>Farrell</u>, 36 F.2d 845 (2 Cir. 1929):

> "It would reduce patent protection almost to a nullity if an infringer could, in the light of a subsequent disclosure, comb the prior art and piece together portions of earlier patents, while dropping other parts, and thereby invalidating a new combination of old elements. See <u>Webster Loom Co.</u> v. <u>Higgins</u>, 105 U.S. 580, 591."

See also <u>Shaw</u> case, 417 F.2d at 1104-05.

2/ Unexpected beneficial results evidence non-obviousness. <u>In re Gershon</u>, 372 F.2d 535 (CCPA 1967).

It was not obvious to combine these concepts in view of the absence of any teaching in the prior art that such gaps should be pre-set to the precise required dimensions, and in view of the contra-indications in the prior art to flowing glass into such a gap by capillary action.

4. Non-obviousness is also demonstrated by the fact that high level scientists from prominent companies (N.V. Philips, Ampex, IBM, Illinois Institute of Technology, General Electric Co.), were unsuccessful for a decade in arriving at a commercially practicable process for making glass-bonded ferrite heads reproducible within close tolerances, with good yields, and without bubbles, notwithstanding availability of knowledge about capillarity and wettability. Such non-obviousness is enhanced by the apparent simplicity of this solution to a long-standing problem.

5. Non-obviousness is further demonstrated by the adoption and widespread use of the process by the computer industry, and its effect in making the rapid growth of that industry possible.

All these factors augment one another to lead to a conclusion of non-obviousness. As was said in <u>Graham</u>, 383 U.S. at 36:

> "These legal inferences or sub-tests do focus attention on economic and motivational rather than technical issues and are, therefore, more susceptible of judicial treatment than are the highly technical facts often present in patent litigation. See Learned Hand in Reiner v. I. Leon Co., 285 F.2d 501, 504 (1960), cert. den. 366 U.S. 929. See also Note, Subtests of 'Non-Obviousness: A Nontechnical Approach to Patent Validity', 112 U. Pa. L.Rev. 1169 (1964). Such inquiries may lend a helping hand to the judiciary which, as Mr. Justice Frankfurter observed, is most ill fitted to discharge the technological duties cast upon it by patent legislation. Marconi Wireless Co. v. United States, 320 U.S. 1, 60 (1943)... They may also serve to 'guard against slipping into use of hindsight,' Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co., 332 F.2d 406, 412 (1964), and to resist the temptation to read into the prior art the teachings of the invention in issue."

The foregoing should leave no reasonable doubt that the patent meets even the "vigorous" standard of this Circuit urged hereby defendant (DB 28) and is valid. However, if any such doubt should remain, the rulings of this Court require that it be resolved in favor of the patent holder. (Lemelson case, 450 F.2d at 849; Lorenz case, 305 F.2d at 105; Rains case, 406 F.2d at 278.)

Defendant's many self-serving statements, with but sparse support in the evidence, fail to sustain defendant's heavy burden to establish that the Trial Court's findings are clearly erroneous and to show that, on all the evidence, a clear mistake has been made. The decision of the District Court that the patent in suit is valid is correct and should be affirmed.

Respectfully submitted,

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ATTACHMENTS.

PATENT 3,246,383 TO H.P. PELOSCHEK, ET AL

CLAIM 1

1. A method of manufacturing portions of magnetic heads composed of

- (a) two magnetic circuit parts
  - (1) consisting of sintered oxidic ferromagnetic material
  - (2) and having confronting gap surfaces
  - (3) with a gap therebetween
  - (4) filled with a nonmagnetic material bonding the circuit parts together,

comprising:

- (a) placing spacing members
  - (1) having a thickness equal to the desired gap length
  - (2) at opposite ends of
    - (i) a first polished gap surface of one circuit part,
- (b) placing a corresponding polished gap surface of a second circuit part
  - (1) on said spacing members
  - (2) in confronting relationship with said first surface
  - (3) thereby forming a gap between said surfaces,
- (c) placing a quantity of nonmagnetic material adjacent to the gap,
  - (1) said nonmagnetic material having a melting temperature below that of said ferromagnetic material,
- (d) and heating the resulting assembly to the melting temperature of said non-magnetic material, whereby said nonmagnetic material
  - (1) melts,
  - (2) fills the gap by capillary action,
  - (3) and bonds the circuit parts together.

ATTACHMENT A

PATENT 3,246,383 TO H.P. PELOSCHEK, ET AL

CLAIMS 2 AND 4

2. A method according to claim 1 wherein said nonmagnetic material is glass.

4. A method according to claim 1, wherein pressure is applied to the assembly during the heating step

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April 27, 1976

Morris Relson, Esq.
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405 Lexington Avenue
New York, New York 10017

Re: U. S. Phillips Corp. v. National Micronetics et al., Appeal No. 76-7134

Dear Morris:

To the extent, if at all, the parties are unable to agree as to the contents of the appendix in the above captioned appeal, this is to advise you within the scope of Rule 30 (b), Fed. R. App. P. that the sole issue appellants will raise on appeal is whether the claims of the Peloschek et al. patent 3,246,382 are invalid as obvious pursuant to 35 U.S.C. 103.

We await your agreement regarding use of the deferred appendix procedure to Rule 30 (c) and, to this end, enclose an appropriate Stipulation.

Very truly yours,

Stephen B. Judlowe

SBJ:sp
Enc.

ATTACHMENT B

Method of Doing Business

Though seemingly within the category of a process or method, a method of doing business can be rejected as not being within the statutory classes. See Hotel Security Checking Co. v. Lorraine Co., 160 Fed. 467 and In re Wait, 24 USPQ 88, 22 CCPA 822 (1934).

Scientific Principle

A scientific principle, divorced from any tangible structure, can be rejected as not within the statutory classes. O'Reilly v. Morse, 15 Howard 62.

This subject matter is further limited by the Atomic Energy Act explained in § 706.03(b).

706.03(b) Barred by Atomic Energy Act [R-18]

A limitation on what can be patented is imposed by the Atomic Energy Act of 1954. Section 151(a) (42 U.S.C. 2181a) thereof reads in part as follows:

> No patent shall hereafter be granted for any invention or discovery which is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon.

The terms "atomic energy" and "special nuclear material" are defined in Section 11 of the Act (42 U.S.C. 2014).

Sections 151(c) and 151(d) (42 U.S.C. 2181c and d) set up categories of pending applications relating to atomic energy that must be brought to the attention of the U.S. Atomic Energy Commission. Under rule 14(c), applications for patents which disclose or which appear to disclose, or which purport to disclose, inventions or discoveries relating to atomic energy are reported to the Atomic Energy Commission and the Commission will be given access to such applications, but such reporting does not constitute a determination that the subject matter of each application so reported is in fact useful or an invention or discovery or that such application in fact discloses subject matter in categories specified by the Atomic Energy Act.

All applications received in the Patent Office are sent to Licensing and Review for screening by Group 220 personnel, under rule 14(c), in order for the Commissioner to fulfill his responsibilities under section 151(d) (42 U.S.C. 2181d) of the Atomic Energy Act. Papers subsequently added must be inspected promptly by the examiner when received to determine whether the application has been amended to relate to atomic energy and those so related must be promptly forwarded to Licensing and Review.

All rejections based upon sections 151(a) (42 U.S.C. 2181a), 152 (42 U.S.C. 2182), and 155 (42 U.S.C. 2185) of the Atomic Energy Act must be made only by Group 220 personnel.

706.03(c) Functional [R-34]

See Ex parte Ball et al., 1953 C.D. 4; 675 O.G. 5: In re Arbeit et al., 1953 C.D. 409; 677 O.G. 843 and Ex parte Stanley, 121 USPQ 621.

> *35 U.S.C. 112. Specification.* The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.
>
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or dependent form, and if in dependent form, it shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.
>
> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Paragraph 3 of 35 U.S.C. 112 has the effect of prohibiting the rejection of a claim for a combination of elements (or steps) on the ground that the claim distinguishes from the prior art solely in an element (or step) defined as a "means" (or "step") coupled with a statement of function. However this provision of paragraph 3 must always be considered as subordinate to the provision of paragraph 2 that the claim particularly point out and distinctly claim the subject matter. If a claim be found to contain language approved by paragraph 3 such claim should always be tested additionally for compliance with paragraph 2 and if it fails to comply with the requirements of paragraph 2, the claim should be so rejected and the reasons fully stated.

Paragraph 3 of 35 U.S.C. 112 makes no change in the established practice of rejecting claims as *functional* in situations such as the following:

1. A claim which contains functional language not supported by recitation in the claim of sufficient structure to warrant the presence

ATTACHMENT C

of the functional language in the claim. An example of a claim of this character may be found in In re Fuller, 1929 C.D. 172; 388 O.G. 279. The claim reads:

A woolen cloth having a tendency to wear rough rather than smooth.

2. A claim which recites only a single means and thus encompasses all possible means for performing a desired function. For an example, see the following claim in Ex parte Bullock, 1907 C.D. 93; 127 O.G. 1580:

In a device of the class described, means for transferring clothes-carrying rods from one position and depositing them on a suitable support.

Note the following cases:

1. In re Hutchinson, 69 USPQ 138, 33 CCPA 879 (1946), the terms "adapted for use in" and "adapted to be adhered to" were held not to constitute a limitation in any patentable sense.

2. In re Mason, 114 USPQ 127, 44 CCPA 937 (1957), the functional "whereby" statement was held not to define any structure and accordingly could not serve to distinguish.

3. In re Boller, 141 USPQ 740, 51 CCPA 1484 (1964), the term "volatile neutralizing agent" was held to be patentably effective and commensurate with the breadth of the disclosed invention.

4. In re Land and Rogers, 151 USPQ 621 (1966), the expression "adapted to be rendered diffusible in said liquid composition only after at least substantial development" was given weight.

5. In re Halleck, 164 USPQ 647, 57 CCPA 954 (1970), the term "an effective amount" was held not objectionable.

6. In re Swinehart and Sfiligoj, 169 USPQ 226 (1971), held that the meaning of "transparent to infra-red rays" is sufficiently clear.

7. In re Barr et al., 170 USPQ 330, 58 CCPA 1388 (1971), held that the expression "incapable of forming a dye with said oxidized developing agent," set forth definite boundaries. [R-40]

706.03(d) Vague and Indefinite [R-34]

When the examiner is satisfied that patentable novelty is disclosed and it is apparent to the examiner that the claims are directed to such patentable subject matter, he should allow claims which define the patentable novelty with a *reasonable* degree of particularity and distinctness. Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire.

The fact that a claim is broad does not necessarily justify a rejection on the ground that the claim is vague and indefinite or incomplete. In non-chemical cases, a claim may, in general, be drawn as broadly as permitted by the prior art.

The rejection of a claim as *indefinite* would appear to present no difficulties. On occasion, however, a great deal of effort is required to explain just what is wrong with the claim, when writing the examiner's letter. Although cooperation with the attorney is to be commended, undue time should not be spent trying to guess what the attorney was trying to say in the claim. Sometimes, a rejection as indefinite plus the statement that a certain line is meaningless is sufficient. The examiner's action should be constructive in nature and when possible he should offer a definite suggestion for correction.

The mere inclusion of reference numerals in a claim otherwise allowable is not a ground for rejection. But see Ex parte Osborne, 1900 C.D. 137; 92 O.G. 1797.

Alternative expressions such as "brake or locking device" may make a claim indefinite if the limitation covers two different elements. If two equivalent parts are referred to such as "rods or bars", the alternative expression may be considered proper.

The inclusion of a negative limitation shall not, in itself, be considered a sufficient basis for objection to or rejection of a claim. However, if such a limitation renders the claim unduly broad or indefinite or otherwise results in a failure to point out the invention in the manner contemplated by 35 U.S.C. 112, an appropriate rejection should be made.

Generally speaking, the inclusion of (1) negative limitations and (2) alternative expressions, provided that the alternatively expressed elements are basically equivalents for the purpose of the invention, are permitted if no uncertainty or ambiguity with respect to the question of scope or breadth of the claim is presented.

The examiner has the responsibility to make sure the wording of the claims is sufficiently definite to *reasonably* determine the scope. It is applicant's responsibility to select proper wording of the claim, except to the extent that the selection of words makes the claims indefinite. Under no circumstances should a claim be rejected merely because the examiner prefers a different choice of wording.

Still another way in which a claim can be indefinite is where a *non sequitur* occurs. For example, a claim is inferential and therefore indefinite when it recites "said lever" and there was no earlier reference or *no antecedent* in the claim to a lever. An *indirect limitation*

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By Marion M. Snider